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# ANNALS OF SURGERY

A MONTHLY REVIEW OF SURGICAL SCIENCE AND PRACTICE

EDITED BY

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# ANNALS OF SURGERY.

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## A CONTRIBUTION TO THE STUDY OF AMPUTATIONS AT THE HIP-JOINT.<sup>1</sup>

By J. B. MURDOCH, M. D.,

OF PITTSBURGH.

TO surgeons of our day, the cutting off of a limb, is one of the most simple operations in surgery. Requiring neither accurate anatomical knowledge nor much surgical skill, the operation can be taught to anyone having a little manual dexterity. Yet, notwithstanding its simplicity, it has required the patient labor of the most distinguished surgeons, all the way down the ages, to bring the operation to its present state of perfection. The simple matter of how to cut the flaps, how to arrest the hemorrhage, and how to dress the wound, have received the attention and been the subjects of controversy of the best minds of our profession from the time of Hippocrates down to our own day, and still they are questions which have not been definitely answered.

To the railroad surgeon, the subject of amputation is especially interesting. It is the operation which he is most frequently called upon to perform, and this interest increases in proportion to the danger and difficulty of the amputation. It is for this reason that I have selected *amputation at the hip-joint*, as the subject of my present address.

I shall give you the histories of the cases of amputation at the hip-joint in which I have been interested, and the conclusions at which I have arrived.

The first case to which I direct your attention, is one of world-wide fame, and is given in detail in "The Report of Amputations at the Hip-Joint in Military Surgery," by George A. Otis, Assistant Surgeon, United States Army, in Circular No. 7, War

<sup>1</sup> Read before the New York State Association of Railway Surgeons, November 14th, 1892.

Department, Surgeon General's Office, July 1st, 1867. This case is known as "Shippen's Successful Amputation at the Hip-Joint."

It is chiefly for the purpose of continuing the history of this case that this contribution is made. The interest in this case arises from the fact, that, of the 72 cases of primary amputation for gun-shot injury mentioned in the report, this is the only one which is known to have been successful.

Says Dr. Otis: "Taking the 44 primary operations enumerated in the tables, and adding to these twenty-eight similar cases which are only reported numerically, we obtain a total of 72 primary amputations at the hip for gun-shot injury, of which 68 were fatal and one was successful, while the outcome in three cases was involved in uncertainty."<sup>1</sup>

This one case, therefore, is interesting to all surgeons, but especially interesting to the writer of this paper, because of the fact that, at the amputation, he was the operator's chief assistant. For the information of those surgeons who have not seen Dr. Otis' report, let me quote the history in full, from Circular No. 7, page 26.

*Case 1.*—Private James E. Kelly, Co. B, 56th Pennsylvania Volunteers, aged twenty-eight years, was wounded at about nine o'clock of the morning of April 29, 1863, in a skirmish of the First Division, First Corps. on the Rappahannock, nearly opposite Pratt's house, two miles below Fredericksburg. A conoidal musket ball, fired from a distance of about three hundred yards, entered the upper part of his left thigh in front, fractured the femur, and passed out at the posterior part of the thigh. The ball struck the femur four inches below the great trochanter and fractured it somewhat obliquely, but with less comminution than is usual. A long fissure extended, however, to the level of the trochanter minor. The important vessels and nerves were uninjured.

Surgeon Edward Shippen, U. S. Volunteers, Surgeon-in-Chief of the First Division, consulted the senior medical officers of the brigades attached to the division, and it was decided that in order to give the man a chance for his life amputation at the hip-joint should be performed. At four o'clock, seven, hours after the reception of the injury, the patient was placed fully under the influence of chloroform,

<sup>1</sup> Circular No. 7, page 67.

and Surgeon Shippen commenced the operation, assisted by Surgeons G. W. New, A. W. Preston, Browne and Murdoch. The patient's nates were brought well over the edge of the operating table, and the femoral artery was compressed at the groin. A ten-inch catling was then introduced about midway between the trochanter major and the anterior superior spinous process of the ilium, the point at first directed slightly upwards in order to open the capsule of the joint; then the handle was raised and the point made to come out about an inch in advance of the tuberosity of the ischium. A large flap was then cut from the anterior and inner side of the thigh, about six inches in length; the hemorrhage being controlled by Surgeon James B. Murdoch, 24th New York Volunteers, who grasped the flap and compressed the femoral artery before it was cut. The heel of the knife was then placed where the point came out, and the points of entrance and exit were connected by an incision cutting to the bone. Part of the capsule being opened by the first incision, the remainder of it was divided, the round ligament cut, and the head of the femur removed from the acetabulum. The hemorrhage was then arrested, the femoral artery being tied last. The loss of blood was very slight, less even than in an ordinary amputation of the thigh. The stump having been dressed, the patient was placed in an hospital tent, and remained under Dr. Shippen's charge for three days. The operation was admirably borne, and the case was progressing most favorably on May 2d, when the patient was transferred to the Corps Hospital at the Fitzhugh House, under charge of Surgeon A. W. Whitney, 13th Massachusetts Volunteers, in consequence of the movement of the First Division to the battlefield of Chancellorsville. No unfavorable symptoms occurred. The patient improved daily, the stump granulating finely. He had an excellent appetite, and was quite content with the soldier's ration. But Dr. B. A. Clements, Assistant Medical Director, and Dr. Taylor, Medical Inspector, visited him and provided that he should be furnished with such delicacies as the resources of hospital could not supply. In the latter part of May, Surgeon Shippen having returned from Chancellorsville, saw the patient frequently and removed the ligatures until, on May 28th, the last had come away. The case continued to progress favorably until June 15th, when the greater portion of the Army of the Potomac having moved northward, the wounded and sick at the Fitzhugh House were captured by the rebels.

Kelly was taken to Fredericksburg in a wagon, and thence to Richmond by rail, and was incarcerated in Libby Prison. The extraordinary nature of his case appears not to have procured for him

any modification of the amenities of that place of confinement. According to his report, he lay upon the floor on his blanket, and received a diet of diluted tea and corn bread, and twice a week a bowl of soup. He was not subjected to any surgical attendance. After a week of the prison regimen, the wound became gangrenous and a troublesome diarrhœa supervened. On July 14th, the prisoner was exchanged. He was sent to Annapolis and entered the hospital there in an exhausted state. His normal weight before the removal of the limb was one hundred and fifty-five pounds; he now weighed sixty-three pounds. There was a sloughing sore extending from the upper outer angle of the wound downwards over a space larger than the hand. There was a profuse diarrhœa. He was ordered to take pills



FIG. 1. Shippen's successful Primary amputation at the Hip joint.  
(Copied from Circular No. 7.)

of opium and bismuth, with tincture of sesquichloride of iron, and beef essence and rice jelly for nourishment. Bromine was applied to the sloughing parts on three successive days, but without apparent benefit. A dilute lotion of chlorinated soda was then substituted. On July 24th, the slough separated, leaving a clean, healthy, granulating surface. On August 10th, Acting Assistant Surgeon Stovell, who had immediate charge of the case, reported that the patient had steadily improved since his admission and might be considered out of danger. On September 17th, Surgeon T. A. McParlin, U. S. A., reported that Kelly was rapidly improving; that the wound was healed, except at a point where there was a slight purulent discharge and over an ulcerated space as large as a walnut, which was granulating kindly. The patient had been removed to the tent colony or camp of convalescents. On



December 23d, 1863, the wound had entirely healed, and Kelly visited Washington and obtained his discharge from service and a pension of one hundred and eighty dollars a year. He then went to his home at Blairsville, near Black Lick Post Office, Indiana County, Pennsylvania. His general health was then good and his weight had increased to one hundred and twenty-four pounds. In the autumn of 1863, before the wound had completely cicatrized, an excellent picture of Kelly, in water color, was made by Mr. Stauch, under the direction of Surgeon J. H. Brinton, Curator of the Army Medical Museum. In December, 1864, Lieutenant Colonel G. K. Johnson, Medical Inspector U. S. A., procured a very satisfactory photograph of Kelly's stump. From these two pictures the plate which accompanies this history was prepared. Kelly still resides at Blairsville, and his general health continues good."

This is the history of this remarkable case, as taken from the records in the Surgeon General's Office, U. S. A.

The subsequent history is as follows :

Kelly is still in good health. In reply to a letter addressed to the postmaster at Black Lick Station, Pa., three years ago, I received the following :

BLACK LICK STATION, PA., Oct. 8, 1889.

DR. J. B. MURDOCH.

DEAR SIR:—In answer to your inquiry, I would say that I am personally acquainted with James E. Kelly; I saw him only a few days since; he is living and in good health, is an active, energetic man. I never knew him to be sick or in ill health. The loss of his leg does not seem to impair his health in any way. He is as active a man on crutches as I ever saw. I have seen him turn somersaults in the street on his crutches. You can reach him if you write to Blairsville, Indiana Co., Pa. -

Respectfully,

A. K. PIERCE, P. M.

At my invitation, I received a visit from Kelly in April last. He came to my office in Pittsburgh. I found him to be a hale, hearty man, fifty-eight years old; walked miles about the city, tiring out a youthful companion who was his escort. He has suffered no ill health, except an occasional attack of colic, since the amputation. He is a farmer, does the work of a farmer, has built a farmhouse for himself, including the putting on and shingling of the roof, with his own hands; walking all over the roof upon his crutches for this purpose.

He has a large family of grown up sons and daughters, and many grandchildren.

Kelly is not a teetotaler. He especially enjoys a drink of old Monongahela whiskey, and prefers to take it straight, like a soldier, out of a tin canteen.

The lessons to be drawn from this case are :

*First.*—That, notwithstanding the fearful mortality following primary amputation at the hip-joint, it is not absolutely hopeless, under the most adverse circumstances.

*Second.*—That the loss of a limb does not necessarily shorten life.

It has been asserted that life could not be prolonged for more than a few years after amputation at the hip-joint. We also know that application for life insurance is usually refused, when made by those who are maimed. The fact that this man has lived for more than twenty-nine years after the removal of his entire lower extremity and is now in excellent health, at the age of fifty-eight, should have weight in judging such matters.

It is to be regretted, as has been suggested by Dr. J. S. Billings, that the records in the pension office, as to the longevity of those who have been maimed, has not been collected and tabulated, in order to make them practically available and useful. It is sincerely to be hoped that the effort which is now being made before Congress, will be successful, in order that the medical profession and the public may be better informed.

*My subsequent experience in amputation at the hip-joint* is as follows :

At the Western Pennsylvania Hospital, Pittsburgh, I have amputated at the hip-joint, within the past three years, four times, for sarcoma, involving the femur.

My first operation was done February 16, 1889. The patient was a young farmer, aged thirty. In this case, in deference to the opinion of others, the arteries were ligated with stout catgut. Secondary hemorrhage occurred on the ninth of the following month, which proved immediately fatal; the patient having lived three weeks after the operation.

*Case 2.*—August 28, 1889. Female, aged 18. Recovery was complete, and patient discharged in twelve weeks after the operation.

I have since learned that this patient died two years after the operation from typhoid fever.

*Case 3.*—May, 1890. Male, aged 25. Patient died in seventy-two hours after amputation, from shock.

*Case 4.*—February 20, 1892. Male, aged 17. Died from shock twenty-two hours after operation.

In addition to these four cases, I have been present as an assistant in four other cases, and have done the operation many times upon the cadaver.

A few words in regard to the dangers connected with the operation, and the best methods of guarding against them.

The dangers are, 1st, hemorrhage; 2nd, shock, and 3rd, sepsis.

*First.*—In regard to the hemorrhage.

The means which have been suggested for its control during the operation, are various.

1. Ligature of the femoral artery, previous to the amputation, first put in practice by Baron Larrey in 1793, and adopted by Valentine Mott, of New York, October 7th, 1824, when he did the first amputation at the hip, performed in America.

2. By making pressure upon the femoral artery as it passes over the body of the pubis. This procedure was first resorted to by the celebrated English surgeon Abernethy.

3. Compression of the abdominal aorta by the fingers of an assistant, introduced into the rectum, or by an abdominal tourniquet.

4. The figure-of-eight elastic bandage of Esmarch, carried above the crest of the ilium, and around the abdomen, as recommended by Mr. Jordan Lloyd.

5. By the use of a rod, introduced into the rectum by means of which pressure is made upon the external or common iliac artery, as recommended by Mr. Davy.

6. By the use of a steel rod, passed under the femoral artery, and around the ends which protude, an elastic tube or band is wound in the form of a figure eight, (8). This is the method known as Trendelenburg's. Dr. Varick, of Jersey City, N. J., who first employed the rod in this country, did not disarticulate

until he had transfixed a second time behind the neck of the femur, and thus compressed the vessels posterior to the bone.

7. At a late meeting of the railroad surgeons of the Pennsylvania lines west of Pittsburgh, it was suggested by Dr. J. J. Buchanan, company surgeon of the Pittsburgh & Fort Wayne Railroad, located at Pittsburgh, that, in amputations at the hip, the abdominal aorta could be compressed most safely and most effectually by the hand of an assistant passed into the abdominal cavity; a previous abdominal section having been made for that purpose. A few months after this suggestion, it was put into practice by Dr. Neal Hardy, a company surgeon of the same road, at Upper Sandusky. The case was successful, and is fully reported in *The University Medical Magazine*, Philadelphia.

8. The method of M. Pean, the distinguished French surgeon at the Saint Louis Hospital, Paris, of controlling hemorrhage in all operations, including amputations, deserves mention. He neither makes use of a tourniquet nor of ligatures, but performs all amputations, including amputation at the hip, with a common scalpel, grasping the arteries with hæmostatic forceps, as he proceeds, either before or after dividing them. In the case of the larger arteries, it is his custom to leave the hæmostatic forceps, which grasp the vessels, hanging in the wound for two or three days; for the smaller vessels, after stopping the bleeding by forcipressure, he relies upon the pressure of the dressings to control the hemorrhage.

It was my privilege, in July, 1891, to witness the results of some of the cases operated upon in this manner at the Saint Louis Hospital; one of which was an amputation at the hip-joint, performed three weeks previous, upon a man in middle life. The man was in good spirits at the time I saw him, not at all anæmic, and bid fair to make a good recovery.

9. The last method which I will mention, is that of Prof. John A. Wyeth, of New York. Let me describe it in his own words:

“Two steel mattress needles, three-sixteenths of an inch in diameter and a foot long, are used. The point of one is inserted an inch and a half below the anterior superior spine of the ilium, and slightly to the inner side of its prominence, and is made to traverse the muscles and deep fascia, passing about half-way between the great tro-

chanter and the iliac spine, external to the neck of the femur, and through the substance of the tensor vagina femoris, coming out just back of the trochanter. About four inches of the needle should be concealed by the tissues.

The point of the second needle is entered an inch below the level of the crotch, internal to the saphenous opening, and passing through the adductors, comes out about an inch and a half in front of the tuber ischii. A piece of strong, white rubber tubing, half an inch in diameter, and long enough to go five or six times around the thigh, is now wound very tightly around and above the fixed needles, and tied."

CONCLUSIONS.—In considering the relative value of these different methods for the temporary arrest of the hemorrhage, it may be observed that the two first are objectionable, owing to the fact that the securing of the femoral vessels does not prevent hemorrhage from the branches of the internal iliac artery.

The third and fifth methods are objectionable because of injury which may be done to the solar plexus, or to the abdominal viscera.

The method recommended by Lloyd is difficult of application, and cannot always be depended upon. My experience with it is similar to that of Keen of Philadelphia, who says: "I have tested this method, and confess that it has not given me any satisfaction; I have had great difficulty in controlling the artery."

The method of Trendelenburg is open to the same objection as the first, viz., that it does not control hemorrhage from the branches of the internal iliac artery; but, as modified by Varick, while it must control the hemorrhage, is so much more complex than the method of Wyeth, as to be rejected in favor of the latter.

Buchanan's suggestion of, first, making an abdominal section for the purpose of getting at the abdominal aorta so as to compress it, may have charms for the gynecologist, who sees no danger in opening the abdominal cavity; but, to the general surgeon, it seems an additional and serious operation.

The method of M. Pean, of controlling the hemorrhage with hæmostatic forceps and pressure, as he proceeds in the operation, I am inclined to look upon with favor, but have had no personal experience in its application.

It was reserved for our distinguished countryman, Prof. John A. Wyeth, of New York, to devise what he has well named the bloodless method. I believe this method to be the best, and the one destined to supersede all other methods for the temporary arrest of the hemorrhage.

There are cases in which it is difficult to pass the needles as directed by Wyeth. My second case was one of this character; a large sarcoma involved the upper end of the femur, bulging up over Poupart's ligament. In this case, the hemorrhage was controlled by manual pressure over the abdominal aorta, and torsion of the vessels as they were reached.

**METHODS OF OPERATING.** These are exceedingly numerous. If each operation were to be named after the surgeon designing it, it would be necessary to describe some forty methods of disarticulation at the hip. Many of them have long since been abandoned, and many differ from one another in very trifling particulars.

The following are the modes now generally adopted:

1. Disarticulation by antero-posterior flaps (transfixion). This is the operation which has already been described when relating the history of Shippen's case. It is frequently spoken of as Liston's operation. The great feature of the operation consists in the rapidity with which it can be performed. Ferguson states that the procedure can be completed (as far as the use of the knife is concerned) in from twelve to twenty seconds. This was a matter of no little moment before the use of anæsthetics. No tourniquet of any kind was employed; the main vessels being secured in the flap itself by the fingers of an assistant, who compresses them, while the flap is being cut. This method is not looked upon with favor by modern surgeons, the loss of blood being necessarily very great.

2. Disarticulation through an anterior-racket incision. It is a feature of this operation that the vessels are secured as they are exposed; the surgeon dealing with the hemorrhage according to the method adopted during the removal of a large tumor. This is the mode adopted by M. Pean, of the Saint Louis Hospital, Paris, to which reference has already been made.

3. Esmarch's: This method is thus prescribed by Mr. Barker in his "*Manual of Surgical Operations*:" "By a strong muscular sweep of the knife, five inches below the tip of the trochanter, all the soft parts of the thigh are divided completely to the bone, and the latter is at once sawn across. The vessels are then ligatured. The bone is now seized and steadied while a second incision is made, commencing two inches above the tip of the trochanter, and carried down along the latter to terminate in the first circular cut." The fragment of the femur is then dissected out. This is very similar (as we shall presently see) to the manner in which Wyeth recommends the operation to be performed.

4. The method of Furneaux Jordan is one which is now very generally adopted by modern surgeons, and, in cases to which it can be applied, is, in my opinion, the best, as being less liable to be followed by shock.

It is not necessary to describe this operation in detail, as it is given in all of our modern text-books of operative surgery. Suffice it is to say that the amputation is made as low down upon the thigh as the condition of the disease or injury will permit (at the junction of the middle and lower third, if possible), by a circular incision. An incision is then made from the top of the trochanter major, downward along the femur, which runs into the circular incision; the soft parts are dissected from the bone, disarticulation being accomplished after dividing the muscles and ligaments by strongly abducting the femur.

By this method of dividing the soft parts low down, shock is, no doubt, much diminished. With regard to the long boneless stump left, Mr. Jordan says: "If the thigh were to remain a soft pendulous mass, it would be a small price to pay for greater safety; but it is a remarkable circumstance that, as a rule, the muscles do not rest until the longest stump has become a short one."

5. The last method which I will describe, is that of Prof. Wyeth, who gives these directions for its performance: "Five inches below the tourniquet, a circular incision is made, and a cuff, which includes the subcutaneous tissues down to the deep fascia, is dissected off to the level of the lesser trochanter, at which level the muscles and vessels are divided squarely, and the

bone sawn through. All vessels, including the veins, are tied with catgut, and the smaller bleeding points can be discovered by slightly loosening the tourniquet. The remaining portion of the femur is now easily removed by dividing the attached muscles close to the bone, and opening the capsule as soon as it is reached. On lifting the end of the bone in the direction of the patient's navel, and dividing the cotyloid ligament posteriorly, the air enters the cavity of the acetabulum, and greatly facilitates the division of the ligamentum teres."

In comparing these different methods of operating, it may be said of the operation by antero-posterior flaps (cut by transfixion), that it has the advantage of great rapidity of execution. Before the days of chloroform, this was an advantage of the greatest value, and, even yet, I am not prepared to admit that the length of time a patient is kept under the influence of an anæsthetic, is a matter of no consideration. Nor do we know how much shock is increased by a prolonged operation. So that even now, in cases requiring amputation for injury, such as the railroad surgeon may be called upon to perform, rapidity of execution is of very considerable importance. This method, also, has a place in military surgery, but can scarcely be applicable to disarticulation for disease.

When the operation is done for disease, the racket method is a great favorite with many distinguished surgeons. Mr. Frederick Treves says of it, in his recent "*Manual of Operative Surgery*:" "The racket method may be considered to be the best. That which employs the anterior incision may be considered to be the most useful."

The method advocated by Esmarch and Wyeth, of doing the circular operation, and immediately sawing off the bone, has the advantage of easy access to the vessels, and securing them at an early stage of the operation; but, in the experience which I have had, is not so easy of execution as I had been led to believe; the chief difficulty being in disarticulating the head of the femur from the cavity of the acetabulum. When the femur is sawn at the level of the lesser trochanter, the fragment is so short as not to be easily handled, and gives no leverage for dislocating the head of the femur. This difficulty was so great, in my last operation, as to require more time than all the



rest of the operation. I was not unmindful of the directions given by Prof. Wyeth to lift the end of the bone in the direction of the patient's naval, and, dividing the cotyloid ligament posteriorly; but, in spite of this, I almost despaired of ever getting the head of the bone out. Perhaps a good deal of my difficulty was owing to a want of skill, but I was consoled by the remembrance of witnessing Prof. Wyeth, himself, one year previous, at

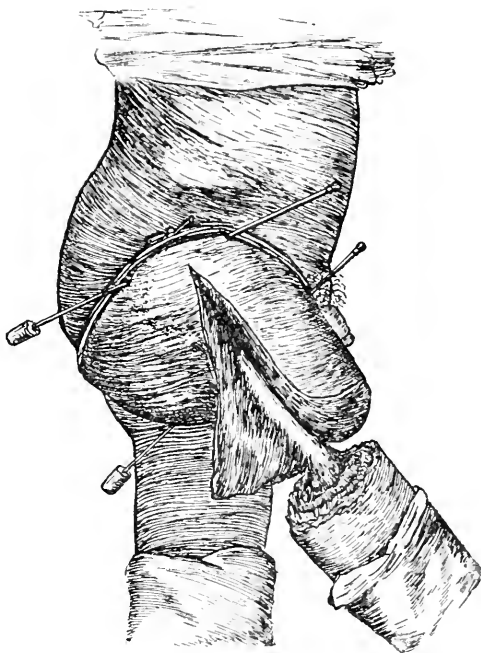


FIG. 2. Ideal method of Amputation at the Hip-joint.

Louisville, Ky., having a good deal of the same difficulty, when he gave a demonstration of the operation upon the cadaver before the Mississippi Valley Medical Association.

In the operation done by Keen, of Philadelphia, in February last, at which Prof. Wyeth was present, the operation required fifty minutes for its performance; how much of the time was consumed in enucleating the head of the bone is not stated. It is reported, however, that Prof. Wyeth suggested a low amputation of the bone. This is an excellent suggestion, as it leaves a

longer lever for manipulating the fragment. But let me ask, why saw through the bone at all? Why not go right on and disarticulate? With the whole limb to act as a lever this is easily accomplished, and, if Wyeth's tourniquet has been properly applied, it can be trusted to control the hemorrhage until the vessels are secured.

Wyeth's method of controlling the hemorrhage during the operation, combined with Furneaux Jordan's amputation, would seem to me to be the ideal operation.

THE PERMANENT ARREST OF THE HEMORRHAGE.—The ligature, either of catgut or silk, is usually depended upon for the permanent arrest of the hemorrhage. I have already stated that Pean relies upon forcipressure for this purpose.

At the Western Pennsylvania Hospital, at Pittsburgh, torsion of the bleeding vessels is the only method relied upon for the permanent arrest of hemorrhage. At this institution, during the past twenty years, torsion has been applied to the femoral artery 146 times, in cases of amputation of the thigh, without a single case of secondary hemorrhage, which could be fairly attributed to the method. For this reason, I cannot but believe that torsion is the preferable method for the permanent arrest of hemorrhage.<sup>1</sup>

There is another element of danger which must be guarded against with equal care as that of hemorrhage, viz., *shock*.

Perhaps more patients die from this cause than from the hemorrhage. Why the shock from an amputation at the hip-joint should be so infinitely greater than amputation near the joint, has never been satisfactorily explained. Many patients die within two or three hours after the amputation, when the loss of blood has not been greater than after an ordinary amputation of the thigh. Indeed, in my last case, as already related, the patient was a boy, 17 years old, and not a very feeble boy; not more than four ounces of blood were lost during the operation, and yet he never rallied from the shock, dying in twenty-two hours after its performance. I have observed the same rapid sinking in other cases, where the loss of blood has not been excessive. For this reason, the greatest care must be

<sup>1</sup> See my article on torsion of arteries. *Medical and Surgical Reporter*, Philadelphia, November 15, 1890.

exercised to maintain the vital forces by the moderate use of stimulants before the operation, and the protection of the surface of the body from cold and exposure during its performance. When this operation is done by any of the usual methods, it must be remembered that nearly one-fifth of the body is removed; and we all know that the nearer to the trunk we go, in an amputation, the greater the shock. In the Furneaux Jordan operation, the muscles are divided as near the knee as the condition of the injury or disease will permit; thus removing the amputation further from the body than any of the other methods. This, to my mind, is a very strong argument in its favor.

SEPSIS.—The time at my disposal does not permit me to say more upon this point than to urge that the strictest precautions to guard against this should be observed both during and subsequent to the operation; the dressings of the wound are so liable to be soiled by the discharges from the bowels and bladder. When the Furneaux Jordan operation is performed, the wound is farther from these sources of infection, and, for that reason, more easily kept clean.

#### SUMMARY.

1. For the temporary arrest of hemorrhage, Wyeth's method is the best, in all cases where it can be applied.

2. The method of operating known as that of the Furneaux Jordan is the best where the nature of the case will permit.

3. When, for any cause, the above methods are inapplicable the operation should be made by one of the Racket incisions, and the vessels secured as they are exposed in the course of the operation.

4. In military or railroad surgery, cases may occur where it is necessary to do the operation with great rapidity. In such cases the antero-posterior flap method, as used in the Shippen case, is the best.

5. For the permanent arrest of the hemorrhage, torsion of the bleeding vessels is recommended as being less liable to be followed by secondary hemorrhage; more easily applied, and leaving no foreign substance in the wound, less liable to convey infection.

# OBSERVATIONS ON THE RADICAL CURE OF HERNIA.

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THE question of the justifiability as well as the desirability of undertaking the radical cure of hernia by open incision, when life is not threatened, save through some accidental complication, the operation thus becoming an operation of convenience merely, will turn upon the answers that can be given to the following questions: 1st. What are the indications by which the surgeon is to be guided as derived from the mortality of the operation? 2d. What is the prognosis as regards ultimate cure?

As time passes and operative methods improve, surgeons become more and more convinced of the desirability of ridding persons suffering from hernia of a condition which is always one of discomfort, and which may, at a moment's notice place life in the greatest peril. The larger the experience the more convincing the proof becomes that these operations, in proper hands are practically devoid of risk to life. Individual observers report series of upward of a hundred cases each without a single death. When the observation is extended still further and all cases are grouped, including those operated upon by surgeons who neither exercise care in the selection of their cases nor pursue a rigid, antiseptic or aseptic regimen in their treatment, the mortality is found to be only one-fourth of one per cent., the temptation is very great to offer the benefit of the operation to all who apply for treatment for hernia. Indeed, there are many surgeons who will agree with Lucas-Championnière that the operation is always

<sup>1</sup>Read before the New York Surgical Society, November 9th, 1892.

justifiable, even as one of convenience. This is not to be wondered at when it is borne in mind, that operative methods having in view only the correction of deformities which do not nor never can threaten life, as for instance, those for talipes, and which therefore are essentially operations of convenience, and nothing more, are looked upon as eminently justifiable, although no better results can be shown from their employment, either in respect to immunity from danger to life in the operation itself or ultimate benefit to be derived.

The most conservative of advanced surgeons, however, agree that a hernia which cannot be retained easily, painlessly and with certainty, by means of a truss should be operated upon with a view of bringing about a radical cure. Those less conservative, though not necessarily to be classed with the famous French surgeon just quoted, assert that a hernia which increases in size rapidly thus requiring frequent changes of size and shape as well as amount of pressure exercised by a truss, should be subjected to the operation for radical cure.

The operation of herniotomy for necessity should always include an attempt at radical cure. It would certainly be an anomaly at the present day to witness an operation for the relief of strangulated hernia in which the surgeon failed to make the attempt, at least, to give the patient the benefit of whatever means were at hand to prevent the recurrence of the accident. The slight additional time occupied and traumatism inflicted can have no weight when placed in the balance with the incalculable benefit to be derived from the radical cure. Under these circumstances the prognosis of the operation for radical cure becomes the prognosis of the herniotomy for necessity, and nothing more, as shown by Socin, of Basle, in a report of 160 cases, 85 of which were strangulated. In case the patient has a double hernia, and a herniotomy for necessity becomes necessary upon one side, the surgeon may with perfect propriety urge upon the patient the desirability of performing the operation for radical cure upon the other side as well.

Equally important with the mortality of the operation itself is the second question, namely, that of the prognosis as regards ultimate cure of the hernia. About the same amount of danger to life attends all operations involving open incision and the

direct treatment of the sac and its contents. While comparatively positive statements can be made, therefore, in dealing with the mortality attending the attempt at radical cure, the case is far different when the question of the permanency of the cure is at issue. Many considerations here enter into the study. These relate first, to the age of the patient; second, to the age of the hernia; third, the amount of pressure to which the parts have been subjected; fourth, the presence or absence of large openings; fifth, the contents of the sac and its previous complete reducibility; sixth, the operative procedure selected in the individual case; seventh, the after-treatment of the case and the after-behavior of the patient.

In the matter of the age of the patient: From the best statistics available, and taking all operations by open incision and peritoneal section into account introduced prior to two and a half years ago, it is found that, in otherwise healthy individuals under twenty-five years of age, fully sixty-two per cent of final and permanent cures are obtained; in those above this age, including even the aged in whom the radical cure operation has been added to a herniotomy for necessity, forty-two per cent. of recoveries took place.

The length of time of the existence of the hernia has a direct bearing upon the question, as well as the amount of truss pressure to which the parts have been subjected. Widely varying anatomical conditions exist according to whether the hernia is old or recent; these in their turn will be modified by such other circumstances as the general health of the patient and the previous habit of truss-wearing. This latter, in the judgment of the writer has a most important bearing, for the reason that processes of atrophy or attenuation of the hernial coverings almost of a certainty lead to the formation of large openings until nearly the whole of that portion of the transversalis fascia which forms the floor of the inguinal canal is thrust forward, and the internal and external abdominal rings become blended together as one. Add to this the possible presence within the sac of large masses of omental fat which have become adherent, and consequently irreducible, and one finds at hand a condition of affairs to which there needs only to be added an obese habit of body to constitute a case exceedingly unfavorable to radical

cure. In other words, if, from age, pressure from wearing a truss or the long persistence of an unreduced hernial mass the extra-peritoneal tissues adjacent to the canal and ring, as well as the proper coverings of the hernia have lost, through atrophy their normal elasticity and resiliency, then, at any time of life, and with any kind of an operation, the ultimate prognosis is unfavorable as compared with the cases in which these considerations do not apply, *i. e.*, in young individuals with recently developed herniæ, or those with congenital herniæ which have comparatively recently become complete. In these latter the greatest proportion of successes is obtained. The nearer the anatomical conditions present approximate, in all classes of cases, to those found in this class, the greater the chances of success.

Taking all possible anatomical conditions into account, it may be stated, in general terms, that, up to within the past two and a half years, an average of at least fifty per cent. of all cases operated upon were cured. It may be stated further that, while almost any of the recognized operations will fulfill the expectations of the most sanguine as regards both immediate and remote results in cases considered favorable, as judged by the above standard, in other words, carefully selected cases; on the other hand, unless care be exercised in the selection of an operation which is applicable to cases to be classed as unfavorable for operative interference, the failures in this class will outnumber the successes.

Various methods of radical cure were attempted prior to the introduction of open incision and direct dealing with the sac, ring and canal. Opposition to the methods of irritation about the pillars and columns of the rings and canal by means of injections, etc., has been so decidedly expressed in recent years that it would be superfluous for me to criticise any procedure which does not bring, as far as possible within the grasp and control of the surgeon all the factors entering into the operation and influencing its result. They do not possess, nor can they ever obtain the confidence of the profession for the reason that they are essentially unscientific and in most instances irrational. To a certain extent the same remarks will apply to the methods designed to produce a sufficient amount of irritation and inflam-

mation in and about the surfaces of the peritoneum, constituting the sac itself and that portion of the parietal reflection at the site of the internal ring. The box-wood plug and curved needle of Weber is a fair example of these methods. Want of exactness in the procedure and uncertainty as to the final result have contributed to impair the confidence of surgeons in measures of this class. Finally, the attempts that have been made from time to time to approximate the margins of the internal ring extra-peritoneally (Wood, Agnew, Chisholm and Lawton) without external incision, although they have met with a greater measure of success than the foregoing, have but slight claim to the confidence of surgeons when compared with more recently devised methods.

All of these operative methods have given way to procedures which, before the days of antiseptic and aseptic technique would have been considered unjustifiable as involving too much risk to life. From the typical procedure of Czerny, of Heidelberg, through all its modifications at the hands of Banks, Leonte, Ball, Bryant, MacEwen and McBurney, the prevailing idea has been to either secure direct union of the ring and inguinal canal, or to fill the gap with either the whole or a portion of the sac itself or material of new formation (scar tissue). Up to three years ago my largest percentage of successes was obtained in the employment of the last named. But I regret to say that cases thus operated upon were found to relapse, in a somewhat smaller proportion of cases, to be sure, but still they have relapsed in sufficient numbers to impel me to seriously consider the claims of more recently devised and promising methods.

In order to fulfil all the indications needful for the radical cure of hernia by operation, the procedure chosen must first, dispose of the hernial sac in such a way as to prevent it from forming a pouch-like depression at the site of the internal ring, which of itself always favors a recurrence of the protrusion, by offering a point upon which a knuckle of intestine may rest; this by its "teasing" action serves as a wedge and finally forces its way into the ring. Second, the point of escape of the hernia must be completely closed as far as possible with normal structures by approximating the edges of the ring accurately



and securing these in a manner calculated to insure firmness and permanency of the closure. Third, the inguinal canal must be practically obliterated by a layer to layer approximation of its incised edges after the removal therefrom of its normal contents. Fourth, the intra-abdominal pressure should be relieved until such time as the theretofore weakened condition of the abdominal wall from truss pressure has been overcome, and the newly-united structures are sufficiently firm to overcome any tendency to recurrence.

As to the disposition of the hernial sac: At the present day, no advanced surgeon would for a moment entertain the proposition to reduce a herniated portion of intestine without first opening the sac after having exposed the latter and inspecting its contents, whether the operation be one of convenience or necessity. The days of reduction without opening the sac in a hernia operation, fortunately have passed, thanks to improved methods of technique and absence of dread of incising the peritoneum which pervaded and influenced the professional mind a quarter of a century ago. Free incisions from without inwards, in order to isolate the sac from its surroundings at the ring is the first essential; the incision should be carried well above the upper limit of the latter, in order to effect complete reduction. This constitutes a lateral laparotomy, inasmuch as this portion of the incision is carried down to, and in cases of strangulation perhaps through the peritoneum; in the latter class of cases it seems to effectually remove the constriction. Complete isolation of the sac to a point well beyond the ring having been accomplished, the former is to be incised and the edges of the opening grasped by several pairs of clamps or Pèans forceps, and given in charge of an assistant. Traction is made upon these while the operator, both by means of the eye and finger, explores the interior. Should any adhesions be found, the incision in the sac is to be extended, and adherent intestine and omentum turned out and dealt with. Masses of omentum may be ligated in sections and removed, the utmost care being exercised to guard against hemorrhage. It not unfrequently happens that a stump of omentum will show no evidences of bleeding while traction is made upon it, but upon its return to the abdominal cavity quite a free oozing will occur. For this reason it is well to keep the stump within

reach, and to investigate its condition just before closing off the abdominal cavity. This can be conveniently done by attaching a clamp forceps to one of its ligatures left long for the purpose.

The management of the neck of the sac is of the next importance. Several devices have been brought forward, but the most generally employed of these consists of the rapidly applied and usually satisfactory method of simply encircling with a stout catgut ligature and tying firmly. The sac is cut away in front of this for a sufficient distance to insure against danger from slipping of the ligature. But the ideal method is to place a line of through-and-through sutures, in cobble-stitch fashion, the sac being held well away from the peritoneal cavity by clamp forceps in the hands of an assistant, to prevent a portion of intestine or omentum from becoming entangled in the line of sutures. The suture material employed for this purpose is catgut, and in order to assure a firm hold for a sufficient length of time, chromicized gut is to be preferred. The bulk of the sac being removed beyond the line of sutures there is now left a simple line of sutured peritoneum, which is to be allowed to fall into position at the site of the ring. Whether this method, which insures against a funnel-shaped depression with its mouth within the abdominal cavity, or simple ligature of the neck of the sac is employed, the important point to be borne in mind is the fact that no portion of the sac is to be permitted to occupy the internal abdominal ring, or canal.

The next point upon which particular care is to be bestowed is such a disposition of the spermatic cord as will permit of complete obliteration of the inguinal canal and closure of the ring. This cannot be accomplished so long as the cord is permitted to occupy the inguinal groove. However well directed an effort is made to approximate the margins, so long as the cord passes along its natural route the patency of the canal is maintained, or restored in time if destroyed. The very presence of the cord in the canal is a constant menace to the patient. To overcome this the method known as that of Bassini, modified by Postempski, is now employed by me. This consists essentially in displacing the cord in a direction toward the median line, lifting it for this purpose from the canal after completely freeing it and attaching it by loose loops of buried catgut suture

to the abdominal wall beneath the skin. In order to still further counteract any tendency of a new protrusion occurring and following the cord, it has been my habit, ever since I began using the method, now nearly two years ago, to force the cord at the point where it emerges from the ring well up into a slit made in the upper margin of the latter for the purpose, and to give it an upward direction for an inch or more at first, securing it in this position by a loose loop of catgut suture placed at a proper distance above the internal ring. The integument and fascia are dissected up from the aponeurosis of the external oblique for a distance toward the median line sufficient to permit the placing of the spermatic cord in this, its new position, as far as its length will admit of.

Both ring and cord, as well as the inguinal canal being now cleared, the next step to be taken consists in a close approximation of the margins of the gap left. In order to accomplish this in the most perfect manner all drainage of the wound must be dispensed with, and it goes without saying, in these days, that the most rigid aseptic precautions have been adopted, in order to make this entirely safe. If antiseptic fluids have been used these should be washed away with sterilized salt solution, or a solution of the blood salts in normal proportions. In this way any fluid remaining approaches in character normal connective tissue fluid, and no irritation is produced by its presence.

The wound is now ready for suturing. In order to secure proper layer to layer approximation of the divided and separated structures it was formerly the custom to secure these by means of buried catgut sutures. I have abandoned this method ever since employing the Bassini-Postempski procedure, and have substituted for it a method devised by myself, and which I have heretofore described as the "crossed suture."<sup>1</sup> The material employed is crin de Florence, or silk-worm gut. Firm and evenly rounded strands of this are selected. In using it the strand is threaded at both ends upon large and full curved Hagedorn needles. In order to avoid troublesome and annoying unthreading of the needles during the manipulation I secure these to the thread by passing the end of the latter through the eye of the

<sup>1</sup>ANNALS OF SURGERY, May 1892.

needle a second time from the same direction as that from which it was first passed. By this means a firm loop or "bight" holds the strand securely to the needle.

The strand being thus secured to the needles the latter are passed from behind forwards, one through each edge of the divided lowermost layer. The latter consists essentially, in the case of an ordinary indirect inguinal hernia of the muscular structures and conjoined tendon upon the inner margin, and Poupart's ligament upon the outer. At the points where the transversalis fascia presents itself as the floor of the canal, a fold of the latter is included in the loop. Care should be taken in this part of the manipulation not to wound the femoral vessels. The needles, after emerging (the loop being drawn taut) each from its respective side, are reversed as regards position, that which passed through Poupart's ligament being now carried to the inner side and passed through the skin, again from behind forwards, while that which included the inner margin of the lowermost layer, or muscular structures and conjoined tendon is passed through the skin at the outer margin in the same manner. The thread is therefore crossed on a level with the plane which represents the space between the two layers. Upon drawing upon the ends of the threads the loop which includes the muscular structures and conjoined tendon upon the inner, a fold of transversalis fascia in the floor and Poupart's ligament upon the outer side of the wound, is tightened and perfect approximation of these structures results. By tying the suture over the skin the incision is completely closed.

The sutures are placed about three-eighths of an inch apart and a sufficient number are employed to completely close the wound, no drainage being employed. All the sutures are placed in position before any are tied. In accomplishing the latter it is well to begin from above and as each is drawn taut a finger is carried to the bottom of the wound to assure that each is fulfilling its purpose. A strip of protective and the usual dressing, complete the procedure.

The sutures are left in place for at least three weeks; I have left them in for five weeks with no ill effects. They are removed as an ordinary suture by simply cutting the thread upon one side of the knot and making traction upon the other. No difficulty

is found in withdrawing the silk-worm gut, the latter readily following the figure-of-eight track which it forms.

I never permit a patient thus operated upon to even sit up in bed for the first six weeks following the operation. This, at the present time I consider an important adjunct to the operation, although further experience may shorten this time somewhat, in selected cases. In persons in whom, from prolonged truss wearing or other causes there is a loss of resiliency of the wall of the abdomen it is well to prolong the stay in bed for a fortnight longer, and to employ, in addition massage and electricity, following the healing of the wound.

Both in the preliminary—(when possible), and after-treatment the same principles which guide the surgeon in laparotomy cases should govern the case of patients subjected to operations for the radical cure of hernia.

The advantages claimed for this method of operation relates, first, to the plan of placing the cord in such a position as to render it next to impossible for a knuckle of intestine to follow it in its course. Under all circumstances in which a recurrence is favored or produced, the duration of the force is from within forwards and downwards. When the cord is made to assume a course upwards and then inwards before making its descent in the direction of the scrotum nothing short of the patient standing on his head will favor the entrance of a portion of intestine alongside of the cord, and permit it to follow its course. It may be said that the weight of the testicle will tend to straighten the cord finally; this is true to a certain extent, but the manner of placing the sutures here described will prevent this for the reason that the cord is held away from the line of incision by being held entirely outside of these, independently of the chromicized catgut loops which fasten the cord in its new position. Second, the crossed suture secures, in the approximation of the edges of the divided layers separately all the advantages of the buried catgut suture; being removable at will, it presents none of the disadvantages arising from the uncertainty as to the length of time which the latter may be depended upon to securely hold. In addition to this, the crossed suture firmly grasps and securely holds the several layers, not only edge to edge, but surface to surface. The result of this is a firm and solid wall extending from

the parietal peritoneum to and including the skin surface. Third, prolonged maintenance of the dorsal decubitus insures stability and firmness of this wall, and at the same time, aided by massage and faradization restores the relaxed and thinned abdominal wall to some approximation to the normal condition.

In femoral hernia the crossed suture is likewise applicable. The sac is isolated, ligated at its neck and cut away as an inguinal hernia. Poupart's ligament is forcibly retracted upward, when the internal opening of the crural canal is brought into view. The first loop of each suture will include, according to its location, either Poupart's ligament or the lower border of the aponeurosis of the external oblique muscle, the vagina vasorum, the pectoral fascia and the pectineus muscle, or Gimbernat's ligament. The usual care must be exercised here not to injure the vessels. The needles are now reversed, the suture crossed and the margins of the iliac and pubic portions of the fascia lata included in the second loop. The needles are again reversed, the suture again crossed and the fascia and integument included in the last or outer loop, this last being completed by tying the suture upon the outer surface of the skin.

I have operated by this method of cross-suturing, up to the present, 33 times. Of these cases 27 were males and all of these were cases of indirect inguinal hernia. Of the latter again the hernia was of the congenital variety in five cases. There were ten patients under 25 years of age. The oldest patient was 78 and the youngest was three. Of this whole number of cases nine were strangulated and four irreducible, but not strangulated. In one case there was a strangulated hernia upon one side and an irreducible hernia upon the opposite side. Both sides were subjected to operation for radical cure.

In but a single case, that of the patient with femoral hernia in whom suppuration and excessive sloughing occurred, did relapse take place. This patient is now wearing a truss.

No relapses, save the one just mentioned, have been reported. Patients have been strictly enjoined and indeed offered compensation or a reward to report to me upon the slightest evidence of a protrusion or any inconvenience at the site of operation from any cause.

Of the total number of cases operated upon by this method, two are now over 20 months ; nine less than 20 and more than 16 ; six less than 16 and more than 12 ; four less than 12 and more than 8 ; eight less than 8 and more than 4 ; four less than 4 months.

One case strangulated for five days, ended fatally, from extensive septic peritonitis the result of gangrene of the gut and perforation. Her condition was such at the time of her admission to the hospital that it was not possible to administer a general anæsthetic and the operation was done under cocaine anæsthesia.

An operation for the radical cure of hernia which requires the patient to wear a truss subsequently is not worthy the name. Except the patient be relieved of the necessity for wearing a truss, a cure, in the proper sense, has not been attained. I therefore always insist that the patient shall not, for any reason, or for any length of time, wear a truss as a part of the after-treatment.

## ADDITIONAL NOTES ON FORCIBLE OVER-COR- RECTION, IN THE TREATMENT OF RIGID FLAT-FOOT.

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IN considering the question of the radical cure of flat-foot as distinct from simple relief of symptoms, it is very evident that the proper position and functions of the foot must be regained before we may hope for permanent cure.

When the normal foot rests upon the ground the weight line of the body falls through the centre of the heel behind and in a line with the second toe in front.

The foot is perfectly balanced by its various muscles; flexion is combined with abduction, extension with adduction, and in order that the normal walk may be perfectly carried out these movements must be free and unrestrained.

The outer border of the foot, solidly braced by ligaments and usually in direct contact with the sole of the shoe bears, the first shock of weight, while the inner, freely movable portion, terminating in the powerful great toe, supplies the elastic element or spring at the termination of the step when the foot is extended and *adducted*.

In the flat-foot in addition to the sunken arch, as a result and consequence of weakened muscles and displacement of component parts, there is not only an abduction at the medio-tarsal joint, so that the weight line falls inside the great toe, but in addition a voluntary eversion of the foot to avoid activity, which has become painful. Thus the patient walks with the cloddy everted step, substituting flexion at the knee and the simple up and down or hinge motion at the ankle-joint, for the normal activity of the foot itself. More and more strain is thus brought upon the arch and upon its ligaments which should be perfectly protected by muscular activity.



Thus the affection progresses, the deformity becomes more marked and disabling, and with the malposition follow developmental changes in the shape of the bones and the low grades of inflammation usually classed as rheumatic.

On examination then of a well developed and painful flat-foot we shall inevitably find that one motion, the most important of all, that of adduction or the power of turning the foot inward at the medio-tarsal joint, is lost. The muscles which should carry out this motion are weakened and atrophied from disuse, while those on the front and outer border of the foot are spasmodically contracted and resist passive correction of the deformity. There are inflammatory adhesions between the bones, contraction and shortening of ligaments on the outer, and relaxation and lengthening of those on the inner aspect of the foot. It is in this class of cases that etherization and forcible reposition are essential, and the manner in which this is accomplished is of the first importance.

Dr. Wood, in his excellent paper on flat-foot in the *ANNALS OF SURGERY* for November, mentions the method employed by Willett, and it is to be inferred that this is the forcible correction which he would recommend. Mr. Willett's manner of operating is described by Mr. Howard Marsh in Vol. 18 of *St. Bartholomew's Hospital Reports* (Notes on Orthopedic Surgery) as follows:

"The foot is kept as nearly as it can be at a *right-angle* to the leg, its internal border is then turned upwards and its anterior segment is then carried far inwards by rotation at the ball and socket joint, between the astragalus and scaphoid."

According to Mr. Marsh it may be necessary to repeat the operation in aggravated cases. The foot is kept for one month in a plaster bandage and further treatment carried out by prolonged rest alternating with tip-toe exercises and massage. Mr. Marsh is inclined to be dubious as to the advantage of braces in after treatment, but describes a rather cumbersome appliance composed of an upright leg support to which a foot brace is connected by a leather strap. This manner of forcible correction is very similar to that employed by the German surgeons. Hoffa minutely describes the procedure as follows (*Lehrbuch der Orthopädischer Chirurgie*, §, 697): "The foot is brought up to a *right angle* or beyond by division of the tendo Achilles, as recommended by Krause. In this dorsal flexed position the arch

is forcibly deepened by manipulation, and a plaster bandage applied. After several weeks the patient may walk about, wearing for many months a wooden bandage made in the shape of the corrected arch, laced in front so that it may be removed for massage and exercise." The criticisms which I would make on these methods of treatment are, first, when the foot is brought up to a right angle or beyond, it is and must be from the shape of the articulating surfaces of its joints *abducted*, adduction being to any extent in this position, impossible. Second, patients suffering from this affection are as a rule unable to allow themselves the prolonged rest required by Mr. Marsh, nor would they submit to the wooden bandages used by Dr. Hoffa.

The operation which I have recommended and performed in a large number of cases is forcible *over-correction* of the deformity not primarily for the purpose of replacing dislocated bones, but to forcibly overstretch all contracted parts and to break up adhesions which resist and restrain the movement of extension and adduction, the essential movement for carrying out the normal step.

To force a foot into the extreme position of adduction it must be extended (plantar flexed). This may be easily demonstrated on one's own foot. The operation then is as follows: The foot is forcibly moved in every direction to break up adhesions and is finally extended and twisted inward as far as possible. In this position contracted muscles, ligaments and fascia are stretched to their extreme limit, and weakened and lengthened tissues are relaxed. While this is the primary object of the operation the misplaced bones are and must be as far as is possible replaced in normal position, the *os calcis* is drawn downward and inward beneath the astragalus and the arch assumes its greatest depth.

Forcible over-correction can usually be accomplished by the hands alone, but in more resistant cases it is well to place the patient on a low bed, allowing the legs to hang over the edge; the foot can then be seized between the knees, and the necessary force supplied by the thigh muscles.

Although the reposition is often accompanied by a formidable cracking of adhesions the after symptoms are invariably slight. A well-fitting plaster bandage is applied in the over-

corrected position, and the patient allowed to walk about on canes or crutches. In one week the bandages are removed in order that casts of the feet may be taken for braces, the bandages are then re-applied in the same position.

At the end of three weeks all inflammatory appearances have usually disappeared, the patient is able to walk about with the braces and the detention from work is as a rule less than one month.

The essential movement of extension and adduction which has been attained by the forcible stretching, is assured by a daily inward twisting of the foot by, or under the supervision of the surgeon, until passive adduction and extension can be carried out without pain or resistance.

Voluntary assumption of the position becomes possible when the adductor muscles regain their power. I must again insist that it is not enough that the arch of the foot is deepened and that the foot appears perfectly normal, the muscles must regain their normal balance, for as long as the abductors restrain the necessary adduction and extension, the patient is in danger of relapse. This voluntary and involuntary resistance often persists long after pain and discomfort have disappeared, and it can only be overcome I believe by the passive stretching which I have before described. (*Vide N. Y. Medical Journal*, Feb. 27, 1892.) The brace is constantly worn and the displacement never allowed to recur. A waukenphast shoe is to be used, the heel of which is raised if necessary on the inner border, so that the weight line may fall slightly to the outer side. The patient is then instructed in the manner of walking and supporting weight. This is essential to success; he must no longer evert the feet, a position which brings all the weight and strain upon the weakened arch and brace, but must point them straight ahead or parallel to one another, so that he walks over his toes or, in other words, raises the body and flexes the foot in the normal manner by muscular activity. Each step is thus an active exercise by which muscular strength is increased, and the correct position of the foot assured. Walking is to be *encouraged* in the place of long continued rest as advocated by others. If the patient is obliged to stand constantly, the feet are relieved by changing their position, raising the body at times slightly on the toes or again throwing the

weight more on the outer border of the foot. The patient must be made to thoroughly understand and appreciate the fact that cure is not assured by a brace or by an operation, but by his own voluntary exertion. Although massage and technical exercises should be recommended, they may be discarded if we can succeed in freeing the foot from restraint so that passive adduction and extension are possible, supply the patient with a proper brace and shoe and assure ourselves that he walks in the proper manner. This means permanent cure.

For the purpose of comparison one hundred consecutive cases of flat-foot were taken from the records of the out-door department of the Hospital for Ruptured and Crippled. These patients all applied for treatment in the six-and-a-half months prior to November 1st of the present year.

In twenty-four the deformity, pain and rigidity were so great that forcible over-correction was recommended as a preliminary measure. This is, I think, about the usual proportion as seen in dispensary practice. These latter cases have been tabulated according to age and duration of symptoms. It is interesting to note that the class in which the deformity is greatest is the most favorable for permanent cure, as the patients are very amenable to treatment, lending an enthusiastic coöperation to the efforts of the surgeon; an element often lacking in cases of less severity.

#### Cases of Rigid Flat-foot.

	Age.	Duration.	Sex.	Double or Single.
1	21	3 mos.	M.	D.
2	17	1 month	F.	D.
3	22	3 mos.	M.	D.
4	17	3 years	M.	D.
5	17	1 year	F.	D.
6	11	1 year	M.	D.
7	15	1 year	M.	D.
8	15	1 year	F.	D.
9	11	2 mos.	M.	D.
10	14	4 mos.	F.	D.
11	14	. .	M.	D.
12	50	3 mos.	M.	D.
13	14	. .	M.	D.
14	42	. .	M.	S.

	Age.	Duration.	Sex.	Double or Single.
15	15	1 year	M.	D.
16	21	1 year	F.	D.
17	14	. .	M.	D.
18	13	1 year	F.	D.
19	38	1 year	F.	D.
20	13	. .	F.	D.
21	17	. .	F.	D.
22	19	1 year	M.	D.
23	18	. .	M.	D.
24	22	3 mos.	M.	D.

In addition to these cases of simple flat-foot there were five, of so-called chronic sprain of the ankle in which as a result of injury, the foot was rigidly held in an abducted position although the arch was normal in appearance. I have elsewhere called attention to the affection and its treatment.<sup>1</sup>

To illustrate common types of severe flat-foot and the effect of treatment, the following cases may be quoted :

*Case 1*, (No. 4 in tabulated list). A boy, 17 years of age, had worked for three years as a printer. Having finally reached a position by which he became self-supporting, the constantly increasing pain and deformity of his feet, obliged him to give up work. He was, when he applied for treatment, a cripple, unfit for his own or any other occupation. On September 19, the operation of forcible over-correction was performed. One month later he returned to his work, the feet in normal position, with entire relief of pain and every prospect of permanent cure.

*Case 2*. A woman, aged 38, was brought to me for treatment on October 21, with the following history. Increasing pain and weakness of the feet for three years. She had been constantly treated for rheumatism by medicines, massage, baths, etc. The "lumps" on the inside of the feet had been blistered many times to reduce the swelling. She had been obliged to use crutches for three months, and "when in the house dragged herself about in a rocking-chair." In this case, by preliminary rest in plaster bandages, it was possible to bring the feet into proper position without etherization. She is now, November 10, able to walk without discomfort, although the muscles are still weak. In this type, when patients are debilitated

<sup>1</sup> "Persistent abduction of the foot." *New York Medical Journal*, October 11th, 1890.

from constant pain and loss of exercise, massage and tonics are of much importance. Of all tonics, however, the most effectual is the assurance of speedy and permanent relief of an affection considered hopeless.

*Case 3.* This will serve to illustrate the effect of treatment in the rheumatic type of weakened arch. A young man, 19 years of age, applied to me on July 19, 1890. He had suffered from constant pain in the feet for three years. As he was a salesman in one of the large instrument shops in New York, he had had the benefit of advice and treatment from various physicians, and had exhausted the ingenuity of his associates in the application of various supports. He was obliged finally to discard them all, and when I saw him he told me that he "had suffered so much pain and was so discouraged that he wished he were dead." The case to me seemed perfectly hopeless; the boy was emaciated and weak, both the knee and ankle-joints were swollen and infiltrated, the circumference of the ankle being greater than that of the calf. The toe-joints seemed ankylosed. There was no apparent flat-foot or any appreciable spasm. When weight was borne there was well marked abduction of the feet. As the first indication was evidently the relief of pain and improvement of the nutrition, he was not allowed to walk, was given cod liver oil and syrup of the hypophosphites and forced feeding. In the meantime a course of vigorous massage with prolonged soaking of the feet in hot water, was faithfully carried out. In three weeks, braces were applied, and he was allowed to walk about. I then lost sight of the patient, and supposed that he had relapsed. Last summer he came to see me, and to my surprise said that he had continued free from pain, and "had not lost a day's work in two years." His feet were then almost perfectly normal in appearance and function. He continues to wear the braces, although it is probable that they are no longer necessary.

Similar cases occasionally come under observation when as the result of general rheumatism the feet remain rigid and greatly deformed. In such cases I have not hesitated to recommend forcible correction of the deformity on the principle that whenever possible the normal relations of the foot as a weight bearer should be regained.

*Case 4.*—A young lady twenty years of age, was seen in consultation on March 3d, 1892, one and a half years before, the left ankle had been sprained. As the usual treatment failed to relieve the symptoms a specialist was consulted and a long course of daily treat-

ment carried out, including local and general massage, and the use of a leg brace. This support protected the joint somewhat, but the weakness, pain and inability to walk for any distance continued so that the patient had become a semi-invalid. The only complete relief experienced during this time was when the ankle was held in a plaster bandage, and crutches used. It was during the treatment of one of the recurrent sprains that I saw the patient. The condition and cause of the weakness was apparent. Although the foot was normal in appearance, when weight was borne the arch flattened, the fore foot turned outwards opening and exposing the astragalo-scapoid joint which was very sensitive to the slightest touch. As soon as the arch was properly supported the symptoms were completely relieved, and after a short course of local massage and exercises, the patient informed me that she had walked five miles without discomfort. When last seen a few weeks later, the only trace of the former trouble was a slight sensitiveness to deep pressure on the scaphoid bone.

*Case 5.* A delicate girl, eleven years of age, was referred to me on Oct. 25th, 1891, for weakness and deformity of the feet. A specialist had previously been consulted, who had advised leg supports, but the mother said the child was so sensitive that she considered the physical deformity of less consequence than the probable moral effect of the remedy. The feet were so weak that the patient was unable to raise the body on the toes; the deformity was very marked, and the child was awkward and easily fatigued. There was no pain, spasm or limitation of motion. The arch was supported, the child supplied with proper shoes and a course of exercises recommended, which I believe were never carried out. One year later the feet were perfectly normal in appearance and function, and the child is able to walk long distances without fatigue. I have never thought it necessary or advisable to use leg supports in any case of flat foot, or so-called weak ankles. When the arch is protected by a proper brace and shoe, and the weight of the body brought into the normal relation to the foot, the muscles rapidly regain their ability to protect the ankle.

I think it has been made clear that the method of treatment which aims at permanent cure by a reversal of the conditions under which the deformity has developed, differs essentially from efforts at relief of symptoms by applying braces without regard to the condition of the foot, and from those operations which would substitute an ankylosis of an important joint for muscular strength and activity.

More minute details of the treatment, the description of the brace used and the method of its manufacture may be found in the *New York Medical Journal* of February 27th, 1892.

The ability to apply a proper brace under proper conditions is essential to success. No one who has witnessed the immediate relief of pain from the application could doubt for a moment its efficiency or necessity. An habitually misplaced foot remains weak for a long time and must be held in position while the muscles regain their strength. Once the surgeon is familiar with its application and appreciates its use the field of therapeutic effort broadens to include not only the treatment of acquired flat-foot, but its prevention, by a recognition of its predisposing causes and early symptoms. In children, the cases of weak ankles of "growing out joints," those who are awkward and easily fatigued; in older subjects, the easily sprained ankle, the chronic sprains and the like, will be found very amenable to relief by treatment conducted on the principles laid down; that the weight of the body must fall normally on the foot, and that the muscles must be properly balanced and the walk carried out in the normal manner, whatever may have been the cause of the original deformity.

In conclusion I may take this opportunity of thanking the writers of the most recent articles on flat-foot, Drs. Wood,<sup>1</sup> Dane<sup>2</sup> and Dauriac<sup>3</sup> for their kind references to my work on this subject.

<sup>1</sup> Annals of Surgery, Nov. 1892.

<sup>2</sup> Boston Medical and Surgical Journal, Oct. 27th, Nov. 3d and 10th.

<sup>3</sup> Gazette des Hopitaux, Sept. 10th, 1892.



CASE OF ARTERIO-VEINOS ANEURISM OF THE  
AXILLARY ARTERY AND VEIN OF FOUR-  
TEEN YEARS' DURATION.

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THE following case is worth placing on record, partly on account of its rarity, but more particularly on account of the long duration without serious symptoms, and the admirable illustration which it affords of the propriety of non-intervention in certain instances of aneurismal varix.

On December 28, 1888, I saw in Hamilton, Ont., with Dr. Malloch, H. B. T., aged twenty-five, who presented the following condition: He is a strong, healthy young man, with a fresh complexion, well developed muscles and a well-shaped thorax.

*Inspection.*—The apex beat of the heart is in the fifth interspace inside the nipple line. There is a slight fulness beneath the outer half of the left infra-clavicular space, and pulsation is seen in this region; there is also slight, but not nearly such marked, sub-clavicular impulse on the right side. The carotids do not throb visibly, but on the left side above the clavicle there is fullness in the lower cervical triangle, and a distinct impulse. The position and appearance of the left clavicle are normal. It is not elevated. There is perhaps slight fulness in the first intercostal space, near the sternum; there is no special prominence of the first rib, or of the manubrium sterni.

*Palpation.*—The cardiac impulse at the apex has moderate force; there is no thrill. There is no impulse upon the sternum, or beneath the inner half of the left infra-clavicular region. There is a very distinct impulse in the prominence above referred to in the outer half, upon the clavicle itself, and upon the sub-clavicular fulness. There is a continuous vibratory thrill communicated to the hand, which is felt over the whole

region of pulsation, and the entire left side of the root of the neck. It is not felt on the right side, nor over the sternum, nor on the præcordia. There is no definite tumor to be felt either below or above the clavicle; the enlargements referred to are soft, and yield readily to pressure. High up in the axilla there is a fulness in the course of the artery. To the touch it does not give the sensation of a distinct tumor; there is a remarkable continuous thrill in this region which is obliterated here and in the subclavian region when the axillary artery is compressed. The left arm looks normal, the veins are not distended, the finger-nails are neither blue nor incurved, and the tips are not clubbed. The pulse in the left radial is not so strong as in the right; there is no perceptible retardation.

*Percussion*.—The cardiac dullness is normal. Percussion over the manubrium and on the inner half of the infra-clavicular region is clear; the outer half is distinctly resonant.

*Auscultation*.—The heart sounds are clear at apex and base. There is no special accentuation of the aortic second sound; no murmur in the right carotid, or in the right sub-clavian arteries. Over the outer half of the left infra-clavicular area, on the corresponding portion of the clavicle, over the lower cervical triangle from the sterno-mastoid border to the attachment of the trapezius there is a loud continuous *bruit*. This murmur is also heard with great intensity in the axilla, down the inner surface of the arm, and on the front and back of the fore-arm. It is very loud and distinct in the palm of the hand and in the finger tips. In all of these regions the murmur resembles an intense *bruit de diable*, or a venous hum at the root of the neck. At one point only, just below the clavicle, there is a slight systolic intensification of the murmur. Posteriorly the bruit is heard in the sub-scapular space and feebly upon the scapula. Subsequently, when the patient came under my care in Philadelphia, he was seen by Professor Ashhurst, who noticed that pressure upon the axillary artery high up in the arm-pit caused complete disappearance of the thrill and the murmur in the clavicular region. The diagnosis of arterio-venous aneurism was made.

The history of the patient is as follows: When fifteen years of age in running down a sloping grass plot he fell and forced a lead pencil, which was in his watch-pocket, into his side high up

in the axilla. When pulled out this was followed by a gush of blood, which instantly ceased. Shortly after, the arm began to swell and was subsequently black and blue to the wrist. His physician kept him in bed for two days and in the house for ten days with his arm in a sling. He does not seem after this to have had any special trouble. He has been accustomed to take a great deal of athletic exercise; rows in the summer, and has worked hard in the gymnasium during the winter months. He consulted Dr. Malloch for occasional pain in the lower portion of the chest and sleeplessness, but all this time he was keeping up his athletic sports and the condition above described was only discovered accidentally by Dr. Malloch, who stripped him to examine for the cause of the pain. He has had no serious interference with the use of the arm, but considered himself in perfect health. Since the discovery of the condition he has been somewhat nervous and uneasy and says that the pain has been aggravated.

The most careful examination of the axilla fails to discover the point at which the lead pencil entered. The patient was shown at a meeting of the College of Physicians in Philadelphia, in January, 1889, and the general opinion of the surgeons present was that, as the condition had lasted for so many years, and had not seriously interfered with the use of the arm, nothing should be done.

Unfortunately the friends of the patient became uneasy, and not satisfied with the opinions which had been given them, and he returned to the old country, and there sought advice in several quarters. In Dublin he very narrowly escaped operation, and even the day was set, but relying, as he said, on my strong statement, he, to use his own expression, escaped to London, where both Sir Joseph Lister and Sir Wm. Savory counselled non-interference, the former stating that life might not be curtailed at all by the affection, and that if at any time inconvenience arose, the artery might be tied above and below the orifice of communication.

I have heard from this patient within the last six months, and he continues well.

Arterio-venous aneurism of the axillary and sub-clavian vessels is rare. Bramann, in his exhaustive article, (Langen-

beck's Archiv. Bd. 33) was able to collect only ten cases. In several of these the condition lasted for a long time; in one five; another seven; and in a third thirty-three years. In the latter, after persisting for all this length of time without anything more than slight painful sensations in the fingers, the left arm increased in volume, became œdematous, and the veins were distended, a condition which necessitated ligation of the sub-clavian artery.

In this case the lead pencil, in all probability, perforated the artery and vein high up in the axilla, and it is evident that the opening is in the axillary artery, and not in the sub-clavian, for the thrill and pulsation above and below the clavicle disappear when this vessel is compressed high in the arm-pit. The remarkable thrill and fullness in the sub-clavian triangle and the sub-clavian space is associated probably with distension of the sub-clavian vein and its branches. An interesting point in the purring murmur was its intense transmission to the peripheral vessels, and it could be heard loudly even in the finger tips.

## EXPERT EXAMINATIONS AND TESTIMONY IN RAILWAY CASES.<sup>1</sup>

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THE expert witness should never forget that he is employed for the purpose of aiding in securing justice; and, furthermore he who interprets science honestly and truthfully will in the end receive the highest tributes of respect from his peers and best serve the interest of his cliental.

Truth is mighty and brings us nearer to our God, while,<sup>2</sup> "He who tells a lie is not sensible how great a task he undertakes; for he must be forced to invent twenty more to maintain that one."

The further consideration of the duty suggests the following query: what is justice? <sup>3</sup>"To give to every one his own." Furthermore, <sup>4</sup>"Justice discards party, friendship, kindred and is always therefore represented as blind."

The evil spirit—within the human breast—seems to whisper that the demands made on an expert witness are such, that it is impossible for him to maintain the high standard which we have prescribed. Let us briefly examine. Let us therefore take a retrospective view of this whole matter as presented in the light of history. The limits of this article preclude the possibility of detailing individual reminiscences illustrating the various steps by which men have risen from obscurity to the highest pinnacle of fame. However, I shall venture to boldly assert that this desirable point has been universally attained by a fearless and strict adherence to the principles of justice. Let us nevertheless examine further into this matter and investigate the following

<sup>1</sup>Read before the New York State Association of Railway Surgeons, November 14, 1892. <sup>2</sup>Pope. <sup>3</sup>Aristotle. <sup>4</sup>Addison.

question: What is required of the best educated surgeons before going on the stand as a medico-legal witness? He should make a special study in order to prepare himself for the work which is to be performed. Examine the patient minutely and diligently. Hours, and sometimes days, are required for the proper performance of this work. Weigh carefully the writings of the best authors, but don't accept blindly their statements. Accept only the truths and reject the errors. Banish from your mind mere theoretical views. The pathological lesions and carefully-made clinical observations furnish the only reliable basis on which to found a correct diagnosis or to apply rational treatment. The objective symptoms are *nature's positive and truthful declaration* of an injury done to some part of the organized body. In the majority of cases these symptoms point unerringly to the organ or organs which have received the injury.

The subjective symptoms are the patient's declaration made by either words or acts, and may be entirely true, or wholly false, or partly true and partly false, and should therefore be very carefully weighed before they are admitted as important testimony. Briefly stated, objective symptoms are those morbid signs which cannot be either feigned or exaggerated by a litigant, while subjective symptoms can be feigned or exaggerated by the same. In exceptional cases there are pathognomonic symptoms which settle clearly the question of diagnosis. Thus in cases of concussion of the lungs hemorrhages from these organs with a well-marked area of dullness and an absence of respiratory murmur corresponding in locality with the above, points unerringly to the morbid condition when the hemorrhage follows immediately after the concussive accident. It is however true, that the lesions in the lungs may be either the principal injury or a mere complication of another which is more serious. In the majority of cases however, the diagnosis must be based on a certain group of symptoms rather than on pathognomonic signs.

I recently examined a case which illustrates this point and will therefore venture to mention the most important symptoms. The plaintiff was about fifty years old, born in Ireland, came to this country in 1859 and had been employed several years as a porter in a mercantile house prior to 1889. During the month of December of this year he alleges he was injured by being

struck on the back by bags of flour—weighing about one hundred and forty pounds each—the fall of which did not exceed five feet. The plaintiff's feet rested at the time of the accident on the ground while his hands were probably about one foot from the earth. He was at this moment shifting a barrel of flour. He denies all knowledge of the number of bags which fell on him, says, "I was unconscious," but in another portion of his examination reveals a full consciousness at the time, says, "I was pulled from under the bags by another workman. I remember that I walked to an office which was a few rods distant with assistance, seated myself in an arm-chair, was given some whisky, after which I was nauseated, think I vomited a little, an ambulance having been obtained I was sent home."

He details minutely all the occurrences of the day on which he was injured. Prior to the day of the accident he asserts he had been perfectly healthy with the exception of occasional attacks of intermittent fever. At the time of the examination he was in a plethoric condition, face seemed somewhat livid and dull. The body was everywhere covered with a superabundance of adipose, the muscles were soft and flaccid, but in connection with this condition it should be remembered that the plaintiff has performed no manual labor during the past two years and nine months. The objective symptoms were as follows: the whole surface of the body was cyanosed, covered with a profuse perspiration which continued to trickle down for an hour or more while the plaintiff was entirely disrobed and the temperature of the room was only seventy degrees F. The reflexes were completely absent. The temperature was normal. There was no atrophy, or more accurately stated, careful measurements failed to show any want of symmetry in the limbs or other parts. The following are the important subjective symptoms: complained of lameness in the whole of the back immediately after the accident the right ankle was sprained, the right leg is mentioned as a seat of pain, but soon after he adds, "both legs became painful"—loss of sexual power—headache, etc. There is not the slightest indication of paraplegia or any other form of paralysis shown by the plaintiff's statements during the first few months after the receipt of the injury. The bowels and bladder continued to act normally. There is no complaint of numbness or pricking sensa-

tions, etc. The pain in the lower extremities having continued several months he was then attacked with pain in the upper extremities. He now complains of loss of power in the upper and lower limbs. The pulse is frequent and small. The physician in attendance immediately after the accident and under whose care the injured man remained for about three months, says, there was no inflammatory reaction following this injury, and the plaintiff's statements confirm the doctor in this. The plaintiff's appetite has remained continuously good. There is no evidence to show that he has ever suffered from venereal disease, but he admits that he commenced drinking whisky when so young that he does not remember when he commenced—has taken some stimulants every day, and has occasionally been drunk, but does not think he has ever suffered from delirium tremens. He says, "I have never been able to walk more than three miles at any time since I was injured," and when asked why he could not walk further—replied, "I was too weak." An examination of the urine shows that it is acid in reaction and perfectly normal in every respect. The tongue was slightly furred on the day of the examination, the pupils were normal and the patient walked with an awkward limping gait. I am fully satisfied that he has not been coached for this examination by an expert surgeon; but at the same time he exaggerates the injurious effects of the accident and attributes all the ills from which he has suffered since its occurrence to this source.

The opinion which I have expressed in the above is based in part on the statements made by the physician who attended him immediately after the receipt of the injury and for the next three months. This physician is an honorable and trustworthy member of our profession and informs me that he was dismissed from this case, because he refused to give to the plaintiff, at this early date, a certificate of total and permanent disability. The plaintiff then passed into the thralldom of quackery, where he remains at the present time. The claimant's presentation of his case is so defective that it is impossible for any surgeon to base a diagnosis on it, or even conjecture what his real condition is, or has been since the accident. It has been previously stated, that when the plaintiff was disrobed it was observed that every portion of his body was cyanosed while he was perspiring pro-



fusely. How are we to interpret these morbid signs? The cyanosed condition was unquestionably produced by a vasomotor paresis and the complete abolition of the reflexes indicates muscular paresis, while the loss of sexual power may depend partially or wholly on the same morbid condition. It will be here observed that I accept the loss of sexual power as an existing factor in the case, and I am prompted to this action from the fact that such acceptance is in strict harmony with my examination.

The examination fully convinced me in regard to the existence of a multiple motor paresis, while there was no evidence of any sensory disturbance. We are now confronted with the important question, what is the malady from which the plaintiff is suffering? Does the disease take its origin in part or wholly from the accident which has been mentioned? This was apparently followed by no symptoms of paralysis or inflammation. My own experimental studies satisfy me that the force applied was entirely insufficient to produce traumatic lesions of the spinal membranes or cord. The plaintiff's own statements on this point do not warrant the conclusion that any such injury was received, or that even an injury was done to the peripheral nerves. All the statements made which bear on this case during the first three months immediately after the accident are essentially negative. I am therefore convinced that the case before us is one of *chronic alcoholic multiple neuritis*. The plaintiff says, "I have used stimulants daily from my boyhood to the day of the examination—having taken a drink of whisky this morning—and, furthermore have occasionally been intoxicated, but have never suffered from *delirium tremens*."

The outlines here supplied cannot fail to impress on the reader's mind the necessity of a most careful and scientific examination of these cases. It requires on the part of the surgeon scientific knowledge, dexterity, tact and patience. In the examination of these cases *nothing should be taken for granted which can be demonstrated by the most scientific manipulation*. A hasty conclusion, unless based on a pathognomonic sign, is a disgrace to the examining surgeon, and is frequently not only worthless, but highly expensive to the parties who have ordered the service. Here, as in all other cases, honesty is the best policy.

The surgeon having made a full and correct report of the case examined, it is then placed in the hands of your client's lawyer who will decide whether it is a case to be compromised or settled in the courts. In this connection the value of an honest and correct opinion from the surgical expert must become apparent to all. An incorrect opinion furnished by a surgical expert may lead to disastrous litigation or the payment of a large sum of money to secure a compromise even in cases where no disability has been caused by the accident. The possession of scientific knowledge must be regarded as a *sine qua non* for the work required to be performed by an expert. However, the critic will object to the above statement, and assert that it is too general to possess any scientific value in this connection. Therefore I must express myself more definitely on this point. The medico-legal expert *must be able to detect every objective sign—to trace the same to the pathological lesion on which it depends—to weigh correctly every subjective symptom—to discover at this point all efforts at malingering or exaggerating and then to group all signs or symptoms in such a manner as to form a perfect picture of the malady.* To accomplish this object requires dexterity and perseverance. Dexterity of hand enables the surgeon to make the physical examinations in such a manner as to reach the facts, while intellectual dexterity draws from the mouth of the speculative litigant a full statement of the case—but it rarely resembles the purity of a nugget of gold, when first obtained; but may be fitly compared to a poor ore, which contains a small amount of the precious metal and a large quantity of extraneous matter. The same power—intellectual dexterity—when skillfully employed will enable the surgeon to separate truth from falsehood. Dexterity can not be learned from books, but can only be acquired by patience and experience. The next in importance is time and perseverance. With time we bring the truth to light and detect the malady—verily it is the test of truth.

The following expresses the important lesson perseverance:

“Stick to your aim; the mongrel's hold will slip,  
But only crow bars loose the bull-dog's lip;  
Small as he looks, the jaw that never yields,  
Drags down the bellowing monarch of the fields.”—O. W. HOLMES.

The following are the powers which every skillful surgeon must employ to solve the mysteries of obscure maladies, viz.: Scientific knowledge, dexterity, time and perseverance. Hurried examinations and hasty conclusions are always dangerous and commonly worthless. Many of the cases in which medical expert testimony is sought are naturally very obscure; and are likewise frequently severely complicated by litigation symptoms. How can the surgeon eliminate the extraneous matter and thus obtain possession of the facts? No perfect rule can be stated—since every case must be managed according to its peculiarities and surroundings. If any absolute rule ought to be followed, it should be the following:

Let the surgeon under no circumstances antagonize the person whom he is examining. The general observance of this rule is an absolute necessity. But should an exception ever arise be sure to postpone the asking of any question which might possibly give offence to the person being examined, or even his friends, until you have obtained all other information which may have a bearing on the case before you. Let the examination be systematized. Begin with a biographical sketch of the litigant, follow with a history of the accident, and finally, with a careful inspection and thorough examination of every part of the body. This biographical conversation—commencing with the name, nationality, occupation and age—commonly serves the purpose of introducing the surgeon to the party to be examined. This subject may be made very agreeable even to the ordinary litigant, and the surgeon may receive from him certain points which will aid in unravelling the case. Furthermore the litigant in this free and easy conversation frequently forgets to act the part of a deceiver, and he thus enables the surgeon to behold him in his true character. In this conversation the surgeon must take his part—may ask leading questions, etc., but he *must never fail to be a pleased and attentive listener*. Whenever a communication is made bearing especially on the case under consideration the surgeon should not fail to enter it in a note-book. Let me here reiterate what I have previously said, “Never offend or antagonize the party whom you are examining.” Your object is to draw forth from this party a full and honest statement. An angry person under

these circumstances is much inclined to lie and greatly exaggerate, while he may either refuse to allow you to go on with the examination or so act as to prevent you from performing it satisfactorily. The introductory part having been well performed, let the surgeon then ask the litigant to give a full and careful statement of the accident. The description should be noted down in the words of the litigant. There ought not to be asked a single leading question, but should the party wander away from the subject, his attention may be cautiously directed by the surgeon to those points which have some bearing on the case. It is indispensable if the surgeon would obtain all the facts in the case to allow the litigant to go over the details of the case many times. While, at the same time, it will be found advantageous to require him to state the various incidents in the order of their occurrence. The advantages arising from this order of narration are too numerous to be fully enumerated here, but I will briefly say that the narrator finds it much easier to follow up a continuous chain of occurrences—the rehearsal of the last act narrated naturally suggests that immediately following, and so on to the end of the chapter. It is likewise much easier for the surgeon to follow up this unbroken chain of events and to record the same, than it would be if the history were given in a disconnected and haphazard manner. The surgeon ought to be especially careful to obtain a full description of the disability, including its degree, etc., as well as the symptoms which followed immediately after the occurrence of the alleged injury. For the accomplishment of this end the party being examined should state here, for instance, if he has asserted that he was thrown from his berth to the floor, the portion of the body which first came in contact with the floor or other portion of the car, how long did he remain in this position, did he arise without assistance, if assisted by whom, where did he go immediately after the accident? Did he have assistance, etc.? What symptoms did he complain of at this time? Let the surgeon now follow him with the same care during the next forty-eight hours, even for a longer period. The necessity for this procedure is based on the allegation that inflammatory and other morbid changes have arisen from concussive injuries which were not accompanied by morbid symptoms; while it is self-evident

that this statement is a mere hypothesis, which has been disproven by experimental observations and analogous reasoning, but, nevertheless it is worthy of further clinical study, owing to the high authority who gave birth to this theory.

Even if it be admitted that symptoms of degeneration of nerve tissue have manifested themselves six months after an accident, is it therefore logical to conclude that the accident is the cause of the degeneration? Mr. Erichsen, in the last addition of his work, says:<sup>1</sup> "But during the whole of the interval, whether it be of long or short duration, it will be observed that the sufferer's condition, mentally and bodily, has undergone a change. This is a point which I would particularly insist upon. He never completely gets over the effects of the accident. There may be improvement; there is not recovery. There is a continuous chain of broken or ill health, between the time of the occurrence of the accident and the development of the more serious symptoms. It is this that enables the surgeon to connect the two in the relation of cause and effect. This is not peculiar to railway injuries, but occurs in all cases of progressive paralysis after spinal concussion, and may be noted in the histories of many that have been given in these lectures."

That portion of this quotation to which I wish especially to direct attention reads as follows: "*There is a continuous chain of broken or ill health, between the time of the occurrence of the accident and the development of the more serious symptoms. It is this that enables the surgeon to connect the two in the relation of cause and effect.*" This statement should never be forgotten in our attempts to make a diagnosis in cases of concussion of the spinal cord or other injuries of the back which have been included in Mr. Erichsen's so-called "spinal concussion." This statement is in perfect harmony with the results which I obtained in my experiments on animals, so far as it goes, but it is likewise equally true, that in a large number of these cases, although the animal seemed to be very seriously injured immediately after the infliction of the traumatism, they entirely recovered within three to five days. There is another point in connection with these examinations which is certainly entitled to our careful considera-

<sup>1</sup> "On Concussion of the Spine." Longmans, Green & Co., London, 1882, page 158.

tion. It has sometimes been asserted that it is beneath the dignity of our profession to make any effort to detect malingering or exaggerations by observing the movements and general appearance of the party examined after he passed through this ordeal at the hands of the examining surgeon in his office. Here I *differ emphatically* with those who hold the above views, and earnestly declare that since a correct diagnosis is the only basis on which justice can be secured, it is therefore the plain duty of the surgeon to use every means which he possesses for the attainment of this end. He who neglects this on the plea that it is beneath his professional dignity disgraces science and either defeats or contributes to the defeat of justice. The malingerer comes into our office and, having been well coached for this work plays well his part in the drama, while in the surgeon's presence he is apparently the decrepit man; but a few hours later when seen on the street in the company of boon companions he has regained the sprightliness of youth, while his movements resemble those of the young spring-buck.

We have now sketched some of the important outlines to be followed in making a medico-legal examination, while it is thought that a competent examining surgeon will readily fill in the necessary means best suited to secure the object sought in any individual case.

The medico-legal examination is most frequently sought for the purpose of enabling an equitable compromise to be effected; but in other cases it is not demanded until the parties have joined issue in courts of justice. It matters not whether the examination is sought for the former or latter purpose; since it frequently happens that the efforts made to effect a compromise fail and the case is finally adjusted in the court. Consequently a complete written report should be made immediately after this examination and all the notes taken at this time should be carefully preserved. Furthermore, the chief object sought in all these cases is a correct diagnosis which must be sustained by a most thorough and scientific examination. It may be further added that the best coat-of-mail with which an expert witness can be provided, when he takes the witness-chair in a courtroom, is a *thorough knowledge* of the subject on which he is to give testimony and a full determination to *adhere strictly to the*

*truth.* Thus armed he cannot fail to acquit himself creditably. Another point to be kept constantly in view is the fact, that he has no right to be swayed from the path of duty by sympathy or to bestow the benefits of his doubt on either of the contending parties. The expert witness ought at all times in the court-room to avoid, as far as possible, the use of technicalities, the only effect of which is to make the witness appear pedantic, while the court and jury will justly regard this course on the part of the witness as an attempt to hide his own ignorance. However, should it ever happen that a technicality has been employed by a witness, he should immediately explain the same, in language so simple that the most ignorant member of the jury can understand it. Let the witness in no case attempt to explain that which he does not understand, and do not be afraid to admit that many questions in science can be asked which the human mind cannot comprehend or fathom. The answers which are based entirely upon theoretical grounds are entitled to very little consideration; and consequently ought to be commonly avoided in the court-room. This sort of testimony is usually brought forward by lawyers who are managing weak cases, and who thus seek to divert the attention of the jury from the facts of the case before them. The only theories which are entitled to consideration in a court-room, are those which are firmly based on demonstrated facts. The expert witness should never attempt to answer a question until he is sure he understands it. This is commonly a very simple matter and only requires the witness to give strict attention to the queries and at the same time carefully consider the answer he makes to the same. Hypothetical questions are frequently very carefully, even adroitly framed—and often with the especial object of puzzling the witness. The lawyer reads the question rapidly; and then demands that the witness answer it with yes or no. The last procedure I am inclined at all times to regard with suspicion, and therefore ask for a written copy of the query. This copy is then apparently willingly placed in my hands, but frequently I find it is so composed, that while one clause might bear an affirmative answer, the other would require the negative. The witness may then return the question to the lawyer who propounded it, and inform the court that the query cannot be properly answered either negatively or affirma-

tively. The court thus appealed to commonly permits the witness to answer the question in his own language. There should be allowed to the witness sufficient time to consider carefully the question and to formulate properly the answer to the same.

Let the expert witness absolutely banish from his mind while in the witness-chair—all thoughts of hasty or brilliant replies and confine himself strictly to the part which he is playing in the administration of justice. The contemptible attempts sometimes made by lawyers to buldoze, intimidate, or otherwise annoy the witness are very rarely profitable and seldom, if ever justifiable. The natural effects of such procedures are to establish an antagonism between the lawyer and the witness. The witness under these circumstances usually emphasizes more strongly his opinions, while if expert in the matter, receiving the attention of the court, he may be found troublesome in the hands of his persecutor. In order to illustrate this point more clearly, let us suppose that a medical expert is being cross-examined on a medico-legal subject by a lawyer who possesses no knowledge of medicine or surgery, the contest will be quickly settled if waged on a scientific basis, and the victory will belong to the witness and not to his tormentor. The witness, when thus attacked, should redouble his efforts to maintain his serenity lest in an unguarded moment his antagonist should discover some defect in his coat-of-mail. Every question put to the witness should be fully understood before the answer is formulated, and when the reply is put forth, it should be brief and pointed. The witness should avoid, so long as possible, any bandying of personalities with the lawyer, since it is undignified and frequently embarrasses the administration of justice. The expert witness ought never to forget that his sole duty consists in throwing scientific light on the subject under consideration by the court, and thus aiding in procuring justice. In order that he may be able to perform this duty in the most advantageous manner, he ought, in every case where it is possible, to make a special study of the subject matter on which he is likely to be examined before he takes the witness-chair. He ought never to neglect this precaution—even though he may be fully posted,—perfectly confident that he can maintain his opinions against any rival who can be brought against him. He who fails to study constantly, will in



time discover that he is gradually losing some portion of that which he had previously learned.

If he halts in the scientific race he will soon find himself distanced by those who have previously seemed perfectly contented to remain in the rear. Let me here assert that an expert witness should always interpret science honestly—if for no other reason—because it will pay him best in the end. He is frequently called to make expert examinations in order that the case may be compromised, or should all efforts in this direction fail, that he may gain a knowledge of the case which will enable him to serve subsequently his client in court. In all these cases the report should be so full that the claim can be expressed in dollars and cents.

It will therefore be readily seen that those parties who desire expert services wish the report of expert examinations to be entirely reliable. The same is true in regard to expert testimony, the witness having made a careful examination of the patient, entered the court-room, listened attentively to all the testimony, and informed the counsel that his own opinions would be dangerous to the interest of his client's case, will be readily excused and respected for his frankness. Mr. Erichsen says in referring to railway cases in this connection : <sup>1</sup> " It can never be to the interest of a company to fight a notoriously hopeless case as they must incur heavy costs in addition to being mulcted in damages, and if properly advised they will not do so, unless the claim be too exorbitant. They are often led into courts of law by incorrect information as to the real gravity of the case, or are forced into them by the sufferer, irritated by having been dogged by detectives, or the taunts of the company's officer, seeking to obtain exaggerated and vindictive damages."

Another important factor in the causation of litigation are the cormorant lawyers, who, like turkey buzzards, possess a wonderful facility for finding out their prey, and who for a contingent fee are perfectly willing to shame the devil by their own villainy. They seek principally to rob the company, and afterwards they rob their clients. The daily paper has recorded an accident and before its sheets are dry the cormorant lawyers have found their

<sup>1</sup> " Surgical Evidence in Courts of Law." Longmans, Green & Co., London, 1878, page 39, et. seq.

prey in our large cities, especially New York and those in its vicinity.

Mr. Erichsen has correctly stated that, <sup>1</sup>“there are three classes of medical men who appear as witnesses in a court of law. These are, first, the *bona fide* medical attendants of the plaintiff; secondly, the ordinary medical officers of the company; and thirdly, the consulting practitioners—so-called experts. These surgeons are called either by the plaintiff or the company to give opinions on the nature, the extent, and probable duration of the symptoms resulting from the accident that the plaintiff has sustained. The duties of the first two classes of witnesses are usually simple enough. They consist in a great measure in relating the history of the case, the treatment adopted, followed by some general opinions as to its future. The real conflict of evidence, if it occurs, lies between the so-called experts, whose opinions may differ widely as to the essential nature of the actual condition and probable future of the patient.” In regard to the differences of opinion the same distinguished author has justly remarked: “Were such differences of opinion only exhibited by medical men when they appear in courts of law, the spectacle would indeed be a melancholy one, and would augur ill for the character and, possibly, even the honesty of our profession. But such conflicts of opinion are unavoidable accompaniments of all that is still vague and uncertain in the science of medicine . . .

In every department of life, in politics or religion, in science or the law itself, conflict of opinions occur to an extent equal at least to that which is met with in medicine. There is much in medicine, and probably more in surgery, which is absolutely determined; but in some departments there still exists, and none unfortunately, none more conspicuously than in that which becomes the subject of investigation in courts of law, namely, the remote consequences of injuries of the nervous system, one of the most intricate, obscure, and difficult problems in surgery, a certain amount of uncertainty both as to the true pathology and the possible duration of such lesions.” The true explanation of conflicting opinions must in some cases be looked for in

<sup>1</sup> “Surgical Evidence in Courts of Law.” Longmans, Green & Co., London, 1878, page 17.

the relative deficiency of one or the other of the experts. He, who, to-day, is willing to go into a court of law, and in matters of etiology, pathology, and treatment of surgical lesions, base his opinions on the science and practice of surgery, as it was thirty years ago, should be relegated as an antiquated surgeon to a surgical museum. A conflict of opinions between experts cannot be avoided; and consequently, he who enters the field should never neglect to study carefully the various points involved in the investigation. In your study of the case, as well as in giving your testimony endeavor to be systematic. Avoid a rambling desultory course in your examination of a patient and likewise in the study of these cases. Seek out carefully the objective signs, and then group about them the subjective symptoms which are in harmony with, or at least not antagonistic to the former. The citadel thus erected is to be defended by the expert witness; and, consequently it should be built on a strictly scientific foundation. The subjective symptoms, when entirely unsupported by a single objective sign do not afford an adequate foundation for an attack, with any reasonable prospects of recovering damages in the case of a railway injury; but on the contrary in the majority of instances must be construed negatively; and negative evidence cannot justify the jury in finding for the plaintiff. With these brief allusions to the duties, privileges, and the required preparation of medico-legal experts, let us consider briefly whether the present system of procuring expert testimony can be materially improved. Two methods have been suggested heretofore in the place of the practice which is now in vogue, viz., the appointment of the expert witnesses by the State legislatures—while the other suggestion proposes their appointment by an order of the Court in which their services are required. Both of these suggestions are open to the *most serious objections*. In the first place neither of these methods of procedure would procure even mediocrity of talent; since the appointments would always be made for political reasons instead of scientific qualifications.

It is entirely unnecessary to go into further statement on this subject before those who are familiar with political juggleries. Furthermore the corrupt influences brought to bear on political appointees are commonly much more potent than those

which can be employed in the case of private individuals. The political appointee lives on the crumbs doled out to him by his party, while the professional man commonly depends on industry—scientific attainments—and an honorable character for his business success. The more intelligent his cliental the more urgent will be their demands on the expert witness. However, in all this there is much satisfaction, since we are always fully assured that the demands are based on reason and sound judgment and not merely whimsical in their nature.

# ON STRANGULATED OBTURATOR HERNIA, WITH REPORT OF CASE CURED BY OPERATION.

By HAL C. WYMAN, M. D.

OF DETROIT.

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I WAS called on December 2d, by Dr. A. M. Stevenson of Adrian, Michigan, to visit and operate upon a case of obstruction of the bowels, which he had under his care, and which medical treatment had failed to relieve.

The patient was a German woman, married, sixty years of age, and who had borne several children. She was very thin and sinewy; was accustomed to hard labor, her business being that of a scavenger in the city of Adrian. She had generally enjoyed good health, until the commencement of this attack, just a week before I was summoned. At that time she began to suffer severe pain low down in the left side, and along the inner side of the left thigh, toward the knee. At the same time her bowels became constipated and she took physic for several days without getting any action of the bowels; then she became nauseated and Dr. Stevenson was called to see her.

He found moderate distension of the abdomen, the patient vomiting bilious matter, and complaining constantly of pain in the lower part of the abdomen, the pain extending downward through the groin. He made a careful examination for hernia, recognized the presence of induration of the inguinal glands, and by careful palpation detected the presence of a tumor deep in the left groin. This, however, was so indistinct that it could only be made out by comparison with the opposite, painless groin. The patient said the tumor had been there for a long time and she was confident it could not be the cause of her trouble. Her husband, an unusually vigorous old German, had been a sufferer from hernia for many years, and she felt thoroughly informed on that subject and disputed the doctor's diagnosis of hernia, refusing to submit to surgical treatment. The doctor, however, persisted in the use of vigorous taxis, but found himself unable to produce any diminution in the size of the tumor, which was

not larger than a pigeon's egg. He found it firmly attached to the deep sub-pubic tissues. The patient gradually growing worse and the character of the vomiting becoming fecal, he insisted upon an operation and I was summoned.

I examined the region where the doctor had detected the tumor, and with no little difficulty made out the presence of a tumor of some kind beneath the muscles in the bottom of Scarpa's triangle. Then, by vaginal examination, I carefully explored the pelvic region, but could get only negative results. The patient was complaining bitterly of pain in the lower part of the abdomen and about the naval, and there was some soreness along the inner side of the left thigh. She lived under the most squalid circumstances, although possessed of a moderate bank account and owning her home. Her skin looked as though it had not been bathed for years, and the hollows of the thighs were deeply discolored by the infiltration of the superficial skin layers with filth. This, however, we succeeded in removing by the liberal use of strong soap and plenty of rubbing. Then, placing the patient upon a table and having Dr. W. E. Scriber, of Blissfield, Michigan, administer chloroform, we succeeded, after thoroughly shaving the pubis, in getting the field of operation reasonably clean. With scissors I made an incision parallel with the long diameter of the thigh, over about the site of the tumor,—about such an incision as would be made for an operation for femoral hernia, but perhaps a trifle lower, dividing both the skin and fascia lata. Then with my fingers I carefully explored the tumor, finding it covered by the pectineus muscle; this I pushed aside with my finger and continued the separation of the tissues until the sac was reached, which I found protruding through the upper portion of the obturator or foramen. The sac of the tumor was exceedingly thin,—the thinnest I think I have ever seen in any case of hernia. I thought it necessary to divide it in order to restore the tumor to the peritoneal cavity, and after incising it a small quantity of reddish fluid oozed out. The sac contained a very small quantity of omentum and intestine. With a blunt bistoury I nicked that border of the constriction nearest the median line of the body, when the hernia immediately disappeared within the peritoneal cavity and could not again be reached. There was nothing about the margin of the hernial opening that could be brought together and closed with sutures, except the muscles immediately adjacent, hence I thought best to treat the wound with gauze packing. This was done by inserting into it iodoform gauze, changing it as often as it became soiled until the wound healed by granulation. Within two hours

after the operation the patient had a copious evacuation of the bowels. The temperature did not rise subsequently at any time above ninety-nine and one-half degrees, nor the pulse above seventy-four. Dr. Stevenson reports to me, at this writing, that there is a moderate degree of suppuration, but that the woman is progressing nicely.

The rarity of this affection is my excuse for publishing it. The literature of hernia has been recently greatly enriched by the labors of Mercy, and there seems to be no lack of material in the art preservative for the perpetuation of the knowledge bearing upon hernia in general. But, with very few exceptions, there has been very little written upon the subject of obturator hernia, and most of the work has been done by foreign writers. The names of Arnaud, Birkett and Sir Astley Cooper are associated with the history of obturator hernia, while in this country we are indebted to the labors of Mudd and Marcy mainly for ideas concerning it.

The history of surgery—replete as it is with stories of great deeds, tells us much of the signs and symptoms of inguinal and femoral hernias, and the various resources of handicraft by which they have been cured,—even in most ancient times. But it is doubtful whether an accurate description of an obturator hernia was made more than one hundred or one hundred and fifty years ago. Still, it must have been known as long ago as the practice of making post-mortem examinations existed, because in not a few of those cases of death resulting from obstruction of the bowels, obturator hernia would be found as the cause. No doubt because of its deep situation it was rarely detected before death when it occurred in the average subject, unless the tumor was unusually large; and, as we have no descriptions of hernias of any considerable size, in this region, it must have escaped observation.

There are no symptoms by which it can be positively diagnosed in all persons before an operation is performed. The presence of the symptom of obstruction of the bowels, with pain in one or the other inguinal or femoral regions, with the absence of a tumor in either of these regions, would naturally draw the attention of the surgeon to the tissues deep in the upper part of the thigh; and, by a careful examination of the two limbs, he might, even with tolerably fleshy subjects, be able to recognize

the presence of resistance in one side greater than that existing in the other, and thus get evidence sufficient to lead him to make an exploratory operation. But with the advent of more frequent laparotomy in cases of intestinal obstruction in which hernia cannot be made out as a cause, an operation gives access to the obstruction: and when the obturator foramen is the site chosen by nature or accident for the escape of the intestines from their natural habitation, the remedy will be easily found.

The direction of the incision for obturator hernia should be in the direction indicating the least danger of wounding the obturator artery and nerves. The irregularities which come with some fixed regularity in the anatomy of these structures, may always make it doubtful whether the incision necessary to relieve the constriction in a case of strangulated obturator hernia will be followed by a dangerous hemorrhage. But from the fact that the general course of those vessels and nerves bearing the same name as the foramen and hernia is toward the acetabulum, I think the section should be made in the opposite direction, and in my case above described I was careful to make my incision in that direction; and the results were certainly all that could be desired.

Sir Astley Cooper, in speaking of obturator hernias, said that they sometimes embrace only a part of the bowel. In my case the tumor was so small, as well as accompanied by a quantity of omentum, that I do not believe the whole lumen of the bowel could have been strangulated. Further, the fact that the moment the constriction was divided the intestine with its accompanying omentum retreated quickly into the peritoneal cavity and was lost so that I could not reach it through the wound, and the subsequent free evacuation of the bowels, considered from the standpoint of the long time that the obstruction of the bowel existed—about eight days—lead me to think that this was one of those cases in which only a portion of the bowel was caught in the constriction at the obturator foramen.



# TRANSACTIONS OF THE NEW YORK SURGICAL SOCIETY.

*Stated Meeting, November 23, 1892.*

The President, ARPAD G. GERSTER, M. D., in the Chair.

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## CANCER OF THE SIGMOID FLEXURE; EXCISION WITH COLOSTOMY.

Dr. FRED. LANGE presented a specimen of carcinoma of the sigmoid flexure of the colon, together with the patient from whom it had been removed. This patient was a man, fifty-two years of age, whose health had been good until within nine months before being submitted to operation. At that time digestive troubles commenced, with occasional pain in the abdomen and a strong tendency to constipation. This gradually became more marked, until in the winter of 1892 he became unable to have a passage more than once a week without a high injection. He was first seen by Dr. Lange in the latter part of March of the present year, when a thorough examination under ether, revealed a movable swelling in the left side of the pelvis, which, in the light of the history, was believed to be a malignant growth. Upon opening the abdominal cavity by an incision in the left inguinal region, a growth was revealed which involved the lower part of the sigmoid flexure. When the lower end of the gut was put on the stretch the growth could just be lifted out of the incision. An adhesion to the small intestine was separated; several swollen glands in the meso-colon were removed, and about four inches and a half of the gut was excised, about three inches of this being diseased. Both ends were then sewed into the wound, opposite and adjoining each other, the proximal end being above, the distal end below. The operator's reason for not attempting anastomosis or dropping the distal end into the abdominal cavity was because from such procedures in former cases he had had fatal results. In one case death occurred from peritonitis due, it seemed, to necrosis of the distal

end of the gut from want of blood supply. In a second case septic peritonitis set in on the eleventh day after resection, probably in consequence of perforation. Circular suture had been done. In a third case the growth, in spite of its apparent movability, was grown together with the duodenum, the wall of which was severed and sewn up again. This patient died on the second day after operation, probably from septic peritonitis. There had been no unfavorable reaction after the operation in the present case. As yet there was no evidence of recurrence, the patient was doing well, but wished the continuity of the canal restored because of some inconvenience in case of diarrhoea. Dr. Lange expected to meet with some difficulty in restoring the continuity of the gut, owing especially to the fact that some adhesions must exist between the two ends where they lay parallel to each other and in juxtaposition. He did not believe, however, that the operation would involve great danger to life.

Dr. ROBERT ABBE remarked, concerning Dr. Lange's case, that he saw no reason why lateral anastomosis might not be performed in such cases: the parts were freely movable and would permit of an overlapping of four inches, so that there would be no danger of obstruction. It added little to the duration of the operation,—at most thirty minutes after resection. It seemed to him a safe and preferable method unless the patient were in a very exhausted state.

Dr. B. F. CURTIS inquired of Dr. Lange and the members whether they had had any experience with packing around the wound and point of suture with iodoform gauze. He had himself tried the method in one case, but unfortunately the patient died thirty-six hours after the operation, of uræmia due to the etherization. The autopsy showed that the suturing was perfectly tight, the gauze in place, and that it had done no harm by pressure on the intestine or interfering with the passage of feces. The method seemed to him especially desirable in suturing the large intestine where it was usually difficult to get peritoneal covering for both ends of the gut in the entire circumference.

Dr. LANGE said, regarding lateral anastomosis, that he doubted whether the distal end of the gut in this case was sufficiently long and mobile to permit of its being easily done. In restoring the continuity of the gut he thought that circular suture of the mucosa could first be made without opening the peritoneum, and thus a possible source of infection be shut off before proceeding further. Then the abdomen could be opened and a decision reached whether lateral anastomosis

or other procedure should be adopted. He did not think it could be said at once that in these cases lateral anastomosis was the only thing which ought to be done. He believed that if circular suture were feasible it would be the simplest and safest. After operating he would keep the patient on an absolute fluid diet for about fourteen days.

Replying to Dr. Curtis' inquiry, he said he had several times on the stomach packed around the line of suture, and had found it a useful method in preventing infection.

#### ILEUS FROM TWIST OF BOWEL CAUSED BY AXIAL ROTATION OF A MESENTERIC TUMOR: LAPAROTOMY: RECOVERY.

Dr. CHARLES K. BRIDGON presented a patient, a female, aged fifteen years, who had been admitted to the Presbyterian Hospital, October 17, 1892, with symptoms of ileus. Until within four days before admission she had enjoyed good health. She was then suddenly seized with violent abdominal pain and vomiting, both of which symptoms had persisted up to the time of admission, vomitus being of a dark greenish color. The bowels, previously regular, had not moved in seven days.

On admission, temp. 100°; pulse 102; resp. 24; urine negative; patient well nourished, not anæmic; abdomen tympanitic, and moderately distended; sensitive on pressure.

She was etherized, inverted, and an attempt was made to fill the colon with fluid, which was only partly successful, and during this treatment moderate abdominal massage was made in the direction of the intestinal peristalsis, but it was of no avail.

October 18th, 2.30 P. M. Operation. Ether narcosis. Abdomen only moderately distended; dullness on the right side in the region of the kidney; palpation detected a mass that certainly resembled that organ. An incision six inches long was made along the external border of the right rectus muscle; a small opening in the peritoneum gave exit to a few ounces of clear, brownish-colored serum; on enlarging the opening, a large coil of moderately dilated small intestine presented, which was of a dark purplish maroon color, and on separating this from other coils, a bright yellow tumor came into view, measuring about nine inches in circumference. On delivering this through the abdominal wound it was found to be a sessile lipoma growing in the mesentery, and encroaching on the

attached surface of the bowels for a distance of about three-quarters of an inch, there was a twist in the mesentery that appeared to have been caused by axial rotation of the mass. The capsule was divided and the tumor shelled out with facility; only one small artery required to be tied. The opening was closed with a continuous catgut suture, and the twist in the mesentery was unfolded. There was no difficulty in restoring the intestines to the abdominal cavity which was closed by silkworm gut sutures.

In the first twenty-four hours following the operation, the patient had four movements from the bowels. Recovery was uninterrupted, the abdominal wound healing by first intention.

The President, DR. GERSTER, remarked that he had seen the autopsy in a similar case in which no operation had been undertaken, and the patient died. In this case a tumor of the mesentery was present which had caused rotation of the intestine on its axis and fatal obstruction. He had had in his own practice a case of sarcoma of the mesentery as large as the head of a child, the overlying mesentery being greatly thickened and its vessels enormously dilated, the intestine thrust forward and downward, and its circulation apparently interfered with to such an extent as to have caused bloody stools which were noted in the history. The diagnosis of tumor of the mesentery was made, and led to an exploratory incision, but it was not considered advisable to go on and remove the tumor because the patient stood the anæsthesia poorly, her pulse especially evidencing cardiac debility, mesenteric vessels were greatly dilated, and unless the tumor were simply shelled out it would have been necessary to excise the entire transverse colon. A procedure which it was not believed the patient could survive. Simple enucleation would probably have been followed by thrombosis, an accident which he had seen cause death in two cases after stripping up the adherent peritoneum in large tumors of the kidney. His patient was living a year and a half after the exploratory incision.

#### PROSTATECTOMY BY SUPRA-PUBIC INCISION.

Dr. CHARLES K. BRIDGON presented a patient, a man, aged 67 years, who had been admitted to his service in the Presbyterian Hospital, October 6, 1892. Six weeks before admission he had begun to suffer from frequent micturition. At first there had been little pain, but two weeks before he had chills followed by fever, pain, and retention which was relieved by catheter. From that time he has not been able

to empty his bladder without aid. When admitted ineffectual attempts were made to pass a catheter. His bladder was distended up to a point midway between the pubis, and umbilicus. His general condition was very bad, he having had several rigors and his temperature being then  $104^{\circ}$  F. Immediate supra-pubic cystotomy was done.

After the evacuation of a large amount of urine, examination of the interior of the bladder revealed, a small, but prominent middle lobe, which with a fold of mucous membrane which passed off from its apex, on either side, towards the periphery of the lateral lobes, formed a valve that lay up against the internal meatus, forming a pretty effectual barrier to the exit of urine. This was drawn upwards by forceps, divided to the extent of three-quarters of an inch on either side, removing a cuneiform wedge; the hemorrhage was free, but not formidable, and was controlled by a tampon.

During the second week, dilation with large sounds was begun, at the present date, his general condition is excellent, there is a fistulous opening above the pubis which is rapidly closing, but through which a certain amount of urine escapes.

Pathologist Dr. John S. Thacher reports, "middle lobe of prostate, size of ungual phalanx. Mic. ex. shows the tissues in a state inflammation, and nodules of dense connective tissue."

Dr. B. expressed the belief that after the supra-pubic opening should have closed there would no longer be incontinence, although it must be admitted that the prostatic hypertrophy had been both concentric and excentric or lateral, a condition which is sometimes associated with opening out of the prostatic urethra, and incontinence. He added that on several occasions he had performed cystotomy immediately after a rigor with high temperature, supposed to be indicative of urethral fever, the operation being followed by a cessation of these symptoms.

#### MENTAL SYMPTOMS FOLLOWING UPON THE USE OF CONTINUOUS SUPRA-PUBIC DRAINAGE OF THE BLADDER.

Dr. JOHN A. WYETH asked the members whether they had observed any cases of supra-pubic cystotomy with continuous drainage in which after six or eight weeks the patients—old persons—had shown signs of cerebral softening. He had had two patients succumb to that condition after the sixth or eighth week from the operation, the traumatic effects of the operation having long before subsided. He had a third

patient under observation at present, the operation having been performed ten days ago, and attended by very little rise of temperature, perfect drainage, urine about sixty ounces a day, no infiltration, no sepsis, yet the patient showed signs of delirium. In the two fatal cases no autopsy was made but there was no reason to suspect uræmia as the cause of the symptoms, for the urinary excretion was liberal enough, and there were no convulsive movements nor coma.

DR. LANGE had one patient die of delirium on the tenth day after supra-pubic cystotomy, on whom he had operated for the third time for stone in the bladder. At the first operation the middle lobe of the prostate had also been partially removed, but the patient had to continue to use the catheter, as he had done for years before, the only gain being that the instrument could be inserted with more ease. During convalescence from this first operation, he suffered from mental aberration and morbid excitement, probably in consequence, as was then assumed, of iodoform poisoning.

Before the last operation, about 6 years later, in the beginning of this month, he had suffered most intensely from dysuria. About every 20 to 45 minutes he used to bore his catheter into his bladder. He had evident false passages and a very bad state of the urine. He was kept in bed for about five days before the operation and an emulsion of iodoform was injected twice a day after washing the bladder, with good effect on the quality of the urine. The patient was however, in a state of great excitement, and believed he would surely die after the operation. Already on the day before the operation was done, he spoke and acted queerly, having a slight elevation of temperature. He was seventy years old and subject to a chronic catarrh of the lungs, but there was no positive evidence of any serious affection of the kidneys. Chloroform was not well borne and ether had to be resorted to. The operation was quickly done and finished in about 20 minutes. Three stones of the size of cherries were removed.

The patient right after the operation became delirious and manifested an exacerbation of his diffuse bronchial catarrh, undoubtedly due to the ether. His urine improved very soon, but he never regained entire consciousness and got no rest day and night except for short periods after having taken hyoscyamine and chloralamide. His temperatures were moderate. At last, with the development of hypostatic symptoms in the lungs, they rose. He mostly refused nourishment and did not retain rectal enemata.

His respiration was very exceptionally hurried and noisy. About every five minutes it would stop entirely and the patient would

apparently fall asleep, to awake at the next minute again in a state of great excitement. He literally worried himself to death through his incessant muscular efforts and finally died with œdema of the lungs. It is difficult to say what the cause of his mental disorder had been. Perhaps iodoform, which from ulcerated surfaces of the bladder might have been absorbed, and the opening of one false passage could be distinctly felt in that deep funnel, which is formed by the enormously hypertrophied prostate. The influence of ether upon the development of the bronchial catarrh in spite of the short narcosis was quite evident.

Dr. WYETH said a moderate amount of iodoform packing was used in one of his cases, but the cerebral symptoms appeared long after discontinuance of the iodoform.

Dr. BRIDGON said his patient had had some delirium several days after the operation, but it was doubted whether he was quite sane when he entered the Hospital. A tamponade of iodoform gauze was placed at the vesical opening of the urethra, but he believed the delirium was due to the temperature, the operation, and the man's age.

Dr. WILLY MEYER had three patients whose bladders were drained by an apparatus through the supra-pubic opening. One fifty-six years old had submitted to supra-pubic cystotomy over three years ago for the resection of the median lobe of the prostate; another forty-eight years old two years ago had had an extirpation of cancer of the bladder and the third seventy-two years old over one year ago was operated upon for hypertrophy of the bladder and calculus. None had suffered from delirium and all were satisfied with the result. He believed that when peculiar mental symptoms arose after supra-pubic cystotomy they were sometimes due to iodoform.

## NEPHRECTOMY FOR HYDRONEPHROSIS.

Dr. WILLY MEYER presented a boy whom he first saw in September of this year when he was twenty-three months old. The mother then told him that five months previously she had noticed a swelling in the left side of his abdomen, and that during the last two months he had passed his water much oftener than before, from ten to twenty times a day. He had never passed blood. His weight had diminished. Dr. Meyer found an enlargement in the left side of the abdomen, extending from the left lumbar region to beyond the median line and down to the symphysis. The feeling was that of semi-fluctuation, but the little patient's fright and resistance did not permit of a thorough

examination until an anæsthetic could be given on another day. Differential diagnosis had to be made between cyst of the spleen, hydronephrosis, hydatid (echinococcus) or sarcoma, probably cystic, of the kidney. The colon, inflated, lay to the inner side of the tumor. Some fluid which was withdrawn from the tumor was perfectly clear and contained traces of urea; its specific gravity was 1.005, while that of the contents of the bladder obtained by catheter, was 1.020. There was, therefore, another working kidney. The frequency of urination seemed due to the fact that the fluid from the tumor was emptied from time to time into the bladder in small portions. Nephrectomy was decided upon and an incision eight inches long parallel to the twelfth rib down to the tumor was made. A quart and a half of fluid was withdrawn from the cyst which was then shelled out of its bed. This procedure was not very difficult, but would probably have been easier had some of the fluid been left. Adhesions extended up to the diaphragm. A small tear in the peritoneum was at once closed by a few interrupted catgut-sutures. The wound of the abdominal parietes was closed by buried sutures; the rest loosely packed with iodoform-gauze. The diapers were wet next day, showing that the remaining kidney was doing its duty. Uninterrupted recovery. Rapid gain in flesh. The specimen presented showed considerable of the secreting tissue of the kidney which made it unlikely that simple repeated tapping or incision and drainage would have cured the case. The cause of the hydronephrosis seemed to have been the unusual insertion of the ureter into the pelvis of the kidney, which was at an acute angle. The hydronephrosis probably was in its beginning congenital but small. The more the pelvis was expanded, the more the thinner half of the pelvis-orifice of the ureter acted as a valve, the more also was its upper portion compressed. The caliber of the ureter was not explored, but there had been no history of calculus or other cause of possible stricture or occlusion.

#### NEPHRECTOMY FOR SARCOMA OF THE KIDNEY OF ENORMOUS SIZE.

Dr. ROBERT ABBE presented a sarcomatous tumor of the kidney removed that afternoon from a child a year and two weeks old, the weight of the child being fifteen pounds after operation, and that of the tumor seven pounds and a half. The patient was doing well.<sup>1</sup>

<sup>1</sup> One week later the child had a normal temperature and was in perfect convalescence.



The mother said the child had been healthy until seven weeks ago, when she first noticed an enlargement in the abdomen. The tumor, therefore, had grown very rapidly. A lateral incision was made; extending from the lumbar region to the mediap line, and the growth was carefully removed. The tumor was attached by a sort of double pedicle—one a slim vascular one—and below that a very elongated, apparently normal kidney, attached by its tip to the tumor, on the surface of which it was slightly spread out. This long thin kidney was two fingers broad and five inches long. From its centre came the normal pelvis and ureter. More than an inch and a half of what seemed normal kidney was left attached to the tumor and the rest was cut away. The vascular pedicle was then tied with silk. The cut end of the kidney was sutured so as to almost close the capsule over it and it was dropped back into place. A small tamponnade of iodoform gauze was laid in its place, and the abdomen was closed with silk worm gut. Little hemorrhage was encountered except when one large vein was torn, and this was quickly closed so that altogether not more than two ounces of blood were lost. The Trendelenburg posture was of inestimable value, and aided much in making the operation comparatively bloodless.

Dr. Abbe showed two photographs of a child whose case he reported eight months ago as one in which he had removed a sarcoma of the kidney, weighing two pounds and a half, the child being two years and a half old. In that instance not more than half an ounce of blood was lost. When examined yesterday the child was well, and there was no evidence of recurrence.

Dr. B. F. CURTIS then read the paper of the evening, entitled *Removal of a Tumor of the Brain*; recovery. See page 127

## EDITORIAL ARTICLES.

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### THE SURGERY OF THE HYPERTROPHIED PROSTATE.

The surgery of the prostate is of chief interest in its relation to the treatment of obstructive hypertrophy, the great frequency of which would make it an important surgical condition even if its consequences were less distressing. When we remember what those consequences are and how many lives are rendered wretched by them at a time when repose and quiet are most essential and have perhaps been well-earned, we can understand the constantly increasing attention which is being paid to the subject.

At the present time the results of operative interference (prostatotomy and prostatectomy), seem to me to warrant the following statements which although here made dogmatically can be supported by statistics.

Prostatectomy, in spite of the unfavorable opinion of the operation formed and expressed by Socin, Guyon and Sir Henry Thompson, has steadily gained in the estimation of the profession and is to-day a well-recognized and justifiable surgical procedure applicable to a large number of cases.

In the selection of those cases the most important factors are: *a*, the existence of a fair amount of vesical contractility; *b*, the presence of a large quantity of residual urine; *c*, the coexistence of cystitis, especially in cases in which catheterization is difficult or painful; *d*, the absence of toxemia.

As a corollary to these propositions it follows that in patients with general sclerosis, with rigid vessels, polyuria, and hyaline casts, in whom the urine dribbles away even through the catheter and can only be completely evacuated with the help of hypogastric pressure; and in those in whom the quantity of residual urine is small, showing either a moderate degree of obstruction or a high grade of compensa-

tory hypertrophy of the bladder, and in whom the urine remains sterile and catheterization is easy and painless, prostatectomy is not as a rule to be thought of.

The former group if they demand interference on account of bladder infection require perineal prostatotomy and drainage, an easy, rapid almost bloodless operation with the minimum degree of shock. The latter group simply require to be instructed in the use of the catheter, and especially and primarily in the preservation of instrumental and vesical asepsis. It is unquestionable, however, that habitual catheterism even in those cases in which it is easy may be in itself a cause of vesical atony, and it is certainly a strong argument in favor of early operation that the chief palliative measure that replaces it may within a few years—*will* according to Sir Henry Thompson—so ruin the muscular power of the bladder that it can never recover. (Moullin.)

The indications for operation may be considered in more detail.

1. The amount of muscular power remaining in the bladder walls may be roughly estimated by the size and force of the stream of urine which the patient can project *a*, unaided, and *b*, through a catheter. A manometer has been tried with the idea of measuring more accurately the force of the bladder walls but has proved useless. (Moullin.) If doubt exists as to whether feebleness of propulsive power is due to obstructive or degenerative causes, the common association of the latter with the evidences of general sclerosis should be remembered and given due weight. Usually, however, catheterism will clear up this doubt by removing the obstructive element and thus demonstrating the degree of vesical atony or rigidity which is present.

2. The quantity of residual urine is important as showing both the amount of obstruction and the capacity of the bladder. If it is large in spite of the presence of good muscular power it should be regarded as distinctly indicating prostatectomy.

3. The condition of the urine and of the vesical mucous membrane is important. Sterile urine *i. e.* absence of infection of the mucosa with pyogenic or saprophytic organisms is a most favorable factor as regards prognosis; but recurring cystitis, especially when it is unassociated with vesical paresis either atonic or

sclerotic, is an indication for prostatectomy although it undoubtedly increases the danger of death from sepsis. If, with the cystitis there is difficult or painful catheterism, the surgeon finds himself practically forced to operation in spite of these unfavorable circumstances.

4. If the general health is unimpaired and there is no evidence of renal disease, while the local symptoms are pronounced the case is obviously one of the most favorable for prompt operative interference. Unfortunately the great majority of prostatics are not led to consider operation until long after the break-down in catheter-life has been followed by vesical and renal infection and the supervention of the general toxemia, a combination of sapremia, septicemia and chronic uremia, which renders them such unfavorable subjects for the surgeon. The mortality in all forms of prostatectomy has varied from 13.6 (perineal) to 25 per cent. (supra-pubic); perineal prostatotomy has a mortality of but 4.5 per cent. In considering these figures it must be remembered that many of the cases presented all the unfavorable symptoms which have been mentioned and that few cases have as yet submitted to operation at an early date. The wretchedness of the life which awaits such patients certainly renders considerable operative risk justifiable. In a collection of 33 supra pubic prostatectomies in which there were 7 deaths, all the patients but four were over 60; eight were over 70; almost all were in wretched health, many as stated by one operator were "obviously within a few days or weeks of death unless speedily relieved;" another says: "the cases were not selected, except that all mild cases were refused operation and no desperate case was denied the chance, and of these several were nearly dead when taken in hand."

Moullin's table shows 19 deaths in 95 cases of supra-pubic prostatectomy, a mortality of about 20 per cent.; but the last half of the table (which is arranged chronologically) shows only 15 per cent. This is in accord with the history of nearly every important operation now performed by surgeons. With increased experience comes better judgment in the selection of cases and greater facility in operative technique.

It is evident that we have not yet the data for estimating the true mortality of the operation in those cases in which the more serious contra-indications are absent.

As to the choice of operative procedure there is no good reason for dissenting from the general conclusions formulated by McGill (1889) and Belfield (1890). Of the three avenues of approach to the prostate, the urethral, the perineal and the supra-pubic, the former is surgically altogether unsatisfactory and those operations which profess to divide through this channel a "bar" at the neck of the bladder either by a knife (Mercier) or the electro-cautery (Bottini) are based on faulty pathological premises, as that form of obstruction exists in only a small percentage of cases. The dangers of a blind internal incision need not be emphasized.

The perineal route has been shown (Watson) to permit access to the operative field even in the cadaver in not more than two-thirds of adult males, and in only three of the twelve cases operated on by McGill could the projecting portions of the prostate have been removed by the perineal route. Prostatectomy can therefore but rarely be performed in a thorough or satisfactory manner by this method. In the class of cases already described, with loss of expulsive power, cystitis, general degenerative changes, and marked feebleness, perineal prostatotomy or puncture (Harrison) with permanent drainage is the operation of choice, and gives at the same time a chance in the minority of cases for the removal of the projecting middle lobe by the finger or forceps or wire snare. Moullin's tables show twenty-four cases of prostatotomy with one death and fourteen cases of perineal prostatectotomy with two deaths. While I agree with him that the latter operation confers upon the patient a degree of relief with which that following mere cystotomy or drainage offers no comparison, I cannot endorse his statement that the risk is not appreciably greater. The above figures contradict it and even in suitable cases the removal of the projecting lobe must add somewhat to the mortality. It should, nevertheless, be attempted whenever it seems possible as even if it does not result in the recovery of complete control over the bladder, it may render catheterism easy and painless, a condition which is undoubtedly far preferable to the permanent employment of a drainage tube, either perineal or supra-pubic.

Dittel's operation of lateral prostatectomy has been used by Kuster in three cases with a moderate degree of success. It seems

applicable only to those patient in whom the obstruction depends upon enlargement of the lateral lobes and in whom at the same time the small size of the bladder and the rigidity of its walls prevent the supra-pubic operation.

Supra-pubic prostatectomy should be selected for the remainder of those cases in which catheter-life has become impossible, and the time has arrived when early operation by this method should be not only suggested but urged by the surgeon. It is certain that the possibility of serious disease of the urinary tract above the bladder increases in every case in a direct ratio with the duration of obstructive disease anterior to that organ. Indeed we know that even frequency of micturition is of itself a competent cause of ureteral dilatation, hydro-nephrosis, etc., and when to these factors are added the grave vesical changes which follow infection and retention it seems strange that renal disease is ever absent in such patients.

As to the technique of the procedure the adoption of Trendelenberg's position ; the omission of the rectal bag ; the arrest of hemorrhage by an internal pad held in place by a string carried through a perineal incision (Keyes) ; and the use of an ecraseur introduced through the urethra, the mucous membrane over the growth being incised and the wire being guided to its proper place through the usual suprapubic incision, are the modifications most worthy of mention. The latter suggestion seems to me worthy of note as enabling us in desperate cases to reduce the hemorrhage to a minimum and to remove only that portion of the prostate, which is really obstructive. I called attention some time ago (*Medical News*, Dec. 13, 1890), to the fact that the risk of hemorrhage, of shock from prolongation of the operation, of sepsis from the exposure of a larger absorbent surface are all directly increased with the amount of the prostatic overgrowth which is removed, making it most important that we should know how *little* we may do with a reasonable prospect of resulting benefit. In two of the three deaths set down by McGill, as directly due to the operation large portions of the prostate had been taken away and I have had the same experience. That age with its associated debility is not the chief factor in causing death as shown by the fact that of 90 cases in which the age is given (Moullin)

the average was  $64\frac{1}{2}$  years, while of 18 fatal cases the average was only  $66\frac{1}{2}$  years. The difference is not great enough to warrant the assumption that age is of primary importance in determining the mortality. It must not be forgotten that the object of the operation is to restore a "low-level channel" through the prostate and is not simply the excision of the overgrowth (Belfield). Moullin attempts a distinction between those cases in which the immediate indication for operation is intense irritation, and those in which it is obstruction, but wisely adds that it is rare that operation is required for one of these causes alone, both being present usually even if one appears paramount.

He says further and, it seems to me, with less wisdom, that practically, if the operation is to prove successful it resolves itself into removing the whole of the vesical mass, whether it springs from the lateral lobes, or is an upgrowth from the posterior wall, or is a detached nodule. This may be true, but it has certainly not yet been demonstrated. Every surgeon who has done a number of tonsillotomies is familiar with the remarkable diminution in size of that gland which may follow the removal of a comparatively trifling portion. It may be found that similar contraction of the prostate will result from the removal of merely the most salient portion. If so, it would undoubtedly lessen the mortality and greatly promote the general acceptance of the operation. The lessening in the size of the prostate which, in a number of instances, has followed Harrison's operation of puncture of the post-prostatic pouch with a trocar and cannula seems to have some bearing upon the question. In some of his cases after withdrawal of the tube normal micturition was re-established.

In a number of cases (Schmidt, Guyon, McGill, Belfield), various forms of obstruction due to *suburethral* prostatic growth have been found and have either rendered the supra-pubic operation a failure or have required special operative measures for their relief. There seems no reason to question the propriety in every case of supra-pubic prostatectomy of examining the prostatic urethra with the finger and of performing perineal urethrotomy if a hard mass or a rigid ring is discovered (Belfield). This admits of thorough stretching, of incision or of excision and adds but little, if at all, to the dangers of the case.

J. WILLIAM WHITE,

MIRONOW ON THE QUESTION OF ASEPSIS IN LAPAROTOMY.<sup>1</sup>

The clinical observations of the last few years have shown that the employment of antiseptic methods in surgical operations is not infrequently the cause of unpleasant effects, both for the patient as well as for the operators. It has furthermore been observed that good results may be obtained without employing these methods, but by relying solely upon cleanliness. This has, in recent times, induced many surgeons, who have well arranged clinics at their disposal, to substitute asepsis for antiseptics. The question therefore arises, whether it is possible to secure asepsis of the wound without employing disinfecting agents during the operation. In view of the unquestionable advantages of the aseptic method, in which no poisonous substances, such as the disinfecting materials, are introduced into the organism during the operation, a thorough investigation of the practicability of the method is called for. Aside from the work of Prof. Rein,<sup>2</sup> no other comparative researches on the subject are known.

The following observations were made in the gynecologic clinic of Prof. Fritsch in Breslau, and carried out in the bacteriologic laboratory of Prof. Flügge. The observations were conducted under the following conditions:

The same room was used for these laparotomies as was used for the other gynecologic operations. The table, instruments, and other operation-requisites, as brushes, aprons, etc., were especially reserved for the laparotomies and used in no other operations. The instruments and towels which came in contact with the field of operation, were sterilized for one hour immediately before the operation, by means of steam at 100° C. Water was sterilized by boiling for one hour. During the operation the instruments were kept in a two per cent. carbolic solution. Sponges were cleaned in two per cent. carbolic solution and twice in sterilized water. The hands of the operator and assistants were washed first with soap, then for five minutes in 1:1000 sublimat solution, and immediately before and during the operation in sterilized water. The silk ligatures, which

<sup>1</sup> *Centralblatt für Gynäkologie*, 1892, No. 42, Oct. 22.

<sup>2</sup> "Asepsie oder Antiseptik bei Laparotomien?" Prof. G. Rein, *Wien, Med. Presse*, 1891, No. 8.



had been previously boiled for one hour, were sterilized with the instruments just before the operation by means of steam. The abdomen of each patient was first washed with soap, then shaved, washed with 1.1000 sublimate solution, and finally with sterilized water. During the operation no antiseptic substances were introduced into the abdominal cavity, with the exception of iodoform gauze, which was used, after the method of Mikulicz, to tampon the abdominal cavity. The abdominal wounds were dressed either simply with sterilized gauze and cotton, or covered first with dermatol.

This method of operation was followed in aseptic cases, and also in cases in which a septic infection had been previously diagnosed.

The method of investigation was as follows:

For each laparotomy two or three rolls of sterilized gauze in the form of small sponges were prepared and mounted on sponge-holders. These were rolled in a towel, and before the operation sterilized with the instruments. Immediately before the operation these bits of gauze were arranged ready for use. In the course of the laparotomy, the contents of the abdominal cavity were twice investigated: (1) immediately after the opening was made, and (2) at the close of the operation, immediately before suturing the abdominal wound. This was done by wiping the sterilized gauze over the peritoneum of the abdominal and pelvic cavities, the intestines and the tumor. A good sized piece of the gauze was then cut off with a sterilized instrument, and placed in a glass with ten per cent. gelatine and one and a half per cent. agar-agar. In this manner a considerable portion of the abdominal cavity, in every case the entire field of operation, was subjected to this examination for micro-organisms, at the beginning and at the end of the operation. In some cases during the entire operation the atmosphere in the immediate vicinity of the wound was tested by means of Peter's gelatine plates. Pieces of inflammatory adhesions, bits of the peritoneum, the contents of Fallopian tubes, pieces of sponges, etc., were also subjected to bacteriological examination. The observations extend over thirty-one laparotomies performed for various diseased conditions.

Mironow here introduces a table of his researches, in which he gives the name and duration of the operation, complications observed

during the progress of the operation, bacterial contents of the abdominal cavity, (1) at the beginning and (2) at the end of the operation, other objects tested during the operation, and the course of the patient's temperature.

The table shows that among the twenty-eight cases in which the abdominal cavity was examined at the close of the operation, micro-organisms in greater or lesser numbers were identified in twenty cases, while eight cases showed no trace of bacteria. Of the twenty-three cases examined immediately after opening the abdomen, no micro-organisms were discovered in twenty-one. From these figures it must be judged that the gauze used in the experiments was sterile, and that the manipulation of the cultures was likewise without fault. Micro-organisms gained access into the abdominal cavity from without, during the progress of the operation. It is seen that, in the aseptic method of performing a laparotomy, the abdominal cavity, as well as the field of operation in general, does not remain aseptic in a bacteriological sense. Another question now arises, as to how much practical, clinical significance can be attributed to these facts. The table shows that notwithstanding the very frequent presence of micro-organisms in the abdominal cavity at the close of the operation, still septic infection was observed in but one of these cases, and that must be regarded as an exception, for the operation was undertaken after a pronounced state of septicæmia had developed. Nevertheless, from a clinical standpoint, we can not regard with indifference the introduction into the abdominal cavity of non-pathogenic micro-organisms, such as the *microc. cereus albus* or the peculiar oval coccus observed by Mironow in these researches. In eleven of the fifteen cases, in which these micro-organisms were found, a considerable rise of temperature occurred after the operation. The air and the hair and beards of the operator and assistants, which were not sterilized, must be looked to as the sources of the organisms which found access to the peritoneal cavity during the operation; and it is important to observe that in the operations which were quickly completed, which did not last more than fifteen minutes, in which the atmosphere was but for a short time in contact with the peritoneum, the after-course in the majority of cases was entirely without febrile movement.

Among eleven such cases, six had a perfectly normal temperature, three reached  $38^{\circ}$ – $38.4^{\circ}$  C. and immediately subsided, and two cases had a temperature of somewhat above  $38^{\circ}$  for some days. In the three cases in which the atmosphere about the wound was examined, it was found to contain either the same micro-organisms as were found in the abdomen or the same *microc. cereus albus*, which was so frequently discovered in the abdomen in the other cases.

The first endeavor of the surgeon must be directed to the sterilization of the atmosphere about the field of operation; which up to the present time has not been made practicable. Prof. Rein was unable to effect a complete sterilization of the atmosphere during the operation, notwithstanding that it was passed through a cotton filter, and that the Sspajeschko apparatus was used for spraying the air of the operating room. It must be assumed, however, that the air of the operating room usually contains no pathogenic bacteria, and that it can therefore be purified to a higher degree.

The question, whether the abdominal cavity contains micro-organisms capable of growing on gelatine and agar, must, on the ground of the above observations, be answered in the negative. Out of the twenty-three cases, in which the abdominal cavity was examined immediately after the opening, in twenty-one cases the cultures with the gauze remained completely sterile; and only two cases showed even three colonies of the peculiar oval coccus, mentioned above. The explanation of this should, perhaps, be looked for in some imperfection of the method at the operating table. Among the twelve cases in which adhesive peritonitis occurred, no micro-organisms were found immediately after opening the peritoneum in eleven. These observations confirm the views of Bumm,<sup>1</sup> and the opinion of surgeons generally, that adhesive peritonitis can be caused without the presence of bacteria, simply through mechanical or chemical irritation. Finally the observations prove that the contents of cysts and adherent Fallopian tubes, even when of a decided purulent character, in the majority of cases contain no living micro-organisms; which explains the fact that their rupture into the abdominal cavity is, as a rule, followed by no

<sup>1</sup>Zur Aetiologie der septischen Peritonitis. Münchener Med. Wochenschrift, 1889, No. 42.

untoward results. It is evident that the peritoneum itself, as well as the contents of tumors included by it, notwithstanding the arising of inflammatory symptoms, are entirely aseptic, and the use of antiseptic agents is, therefore, superfluous. These researches have shown that in cases in which the surgeon has to do with tissues which before the operation were not infected—and such is the case in the vast majority of laparotomies—the use of asepsis, as employed in the clinic of Prof. Fritsch, is to be regarded as abundantly adequate for the practical scope of a clinic, since it is not possible to render the field of operation aseptic in a bacteriological sense. The views of Prof. Rein concerning the advantages of asepsis over antiseptics must be concurred in.

With regard to uterine cases in which septic infection has occurred before the operation, and in which there is the possibility that septic micro-organisms may find their way into the abdominal cavity during the operation, it is useful, after washing out the uterine cavity, to tampon it with iodoform or sublimate gauze. Still further the employment of the Paquelin cautery is to be recommended in place of the knife and scissors for dividing infected tissue. By this means the neighboring tissue is to a certain extent protected from infection. For these septic cases, the future must teach to what degree antiseptic agents can be employed, and the advantages of the antiseptic over the aseptic method still remains an open question.

In a case subjected to Porro's operation, and in which a pronounced septic condition existed before the operation, the same bacteria were found in the peritoneal cavity as had been found in the uterus. They are small rods, and grow so rapidly that in the course of twenty-four hours large white round colonies develop, which on the surface of the gelatine in the section appear as half circles, while the colonies deeper in the gelatine are smaller and have a yellow color. Under a weak magnifying power, they appear as round plaques, with sharp, even borders, dark brown in the middle, and a yellowish border on the periphery. In the stich-culture in gelatine small, white, round colonies, grouped closely to one another are formed; which do not fluidify the substratum, and which later on assume a yellow color. They grow equally well by room-temperature or at  $37^{\circ}\text{C}$ . On agar

and potato, they form a dense, yellow coat. They grow well in bouillon. These colonies are composed of small, short bacilli, the ends of which are evenly truncated. In the fresh state, these bacilli are in active motion, and group themselves in pairs united by their extremities. They stain readily with methyl blue, gentiana and other colors. The bacilli cultivated in bouillon appear somewhat larger than those grown on gelatine, agar or potato. Introduced in a very limited quantity—one-half to one drop of emulsion—under the skin of a rabbit, or applied as a pure culture on the skin of a mouse, no local inflammation is excited, but a mild, general, constitutional disturbance is produced. The animal appears weak, and the appetite fails. Rabbits develop a febrile movement reaching  $41.3^{\circ}\text{C}$ , which subsides in one or two days. When a pure culture of these bacilli as an emulsion with a six per cent. salt solution is introduced directly into the blood of a rabbit to the amount of 1 ccm., the animal perishes in from thirteen to sixteen hours. Half of this amount causes death in from eighteen to twenty hours. The autopsy usually shows marked hyperæmia of all the parenchymatous organs, and a heart distended with blood. Abscesses or infarctions appear in the liver and kidneys. The bacillus may be cultivated from the liver, kidney, spleen, blood, etc. The injection from these cultures under the skin of rabbits gives rise to the same symptoms as above described. An emulsion of the culture in six per cent. salt solution, sterilized for two hours by steam, when injected into the ear vein of a rabbit in a dose of 2 ccm., caused no reaction. The same negative result followed the injection of a thick bouillon emulsion, after filtering the emulsion by means of the Chamberland filter; even in doses of one, two and even four ccm.

On the ground of these researches it may be concluded that the bacilli in question are possessed of pathological peculiarities, inasmuch as they multiply in the animal organism, and are capable of causing a septicæmia which is rapidly fatal. In shape and peculiarities they resemble nearest the bacillus described under the name of *B. septicus agrigenus*,<sup>1</sup> and can be properly called *B. septicus hominis*. In the case above mentioned this bacillus must be regarded as the

<sup>1</sup>Flügge l. c. p. 275.

only cause which could have given rise to the septicæmia, considering that neither streptococcus nor staphylococcus, the usual causes of septicæmia, were found; and also that before, as well as during the operation, no characteristic septic peritonitis could be discovered. Furthermore the autopsy showed only to a very limited extent any trace of peritonitis, and it can be assumed that this case was not the ordinary form of septicæmia, as the streptococcus is wont to produce. In fact it must be further assumed that aside from the already known forms of septicæmia caused by the streptococcus puerperalis, is still another form caused in puerpera by the above described bacillus—the bacillus septicus hominis.

JAMES P. WAREASSE. -

#### CRANIO-CEREBRAL TOPOGRAPHY AND ITS SURGICAL APPLICATION.

The appearance of two separate volumes from the French gives increased interest to this important subject.<sup>1</sup> Both are exceedingly valuable contributions to the topographical knowledge of the skull and brain. As a basis or starting point for the study of the topography of the encephalon, Poirier selects four points: 1st, the middle of the naso-frontal suture or the vertex of the naso-frontal angle (nasion of Broca): 2d, the external occipital protuberance (inion of Broca): 3d, the external auditory meatus: 4th, the lambda or point of union of the lambdoidal and sagittal sutures. The first mentioned or that represented by the vertex of the naso-frontal angle can, as a rule, be easily identified. The second if not easily recognized, may be, in even the most difficult, by strongly flexing the head. The tension exerted by the ligamentum nuchæ leads to its recognition or it may be detected by following the superior occipital ridge or line. The third point, the external auditory meatus bears a constant relation to the contents of the cranium as shown by numerous cranio-metric measurements. The

<sup>1</sup>P. Poirier: *Topographie cranio-encéphalique. Trépanation.* Paris, Lécrosnier et Babé, 1891. 92 pages.

R. Le Fort. *La topographie cranio-cérébrale. Applications chirurgicales.* Paris, F. Alcan, 1890, 165 pages.

lambda or point of junction of the lambdoidal and sagittal sutures is to be found by tracing the irregularity in the upper angle of the occipital bone which can generally be felt through the skin and by bearing in mind that it is distant from the external occipital protuberance from 6 to 7 cm.

The zygomatic arch gives the horizontal direction. By adopting these points the author regards as landmarks, the glabella, the zygomatic process and the parietal eminence. In mapping out the fissures of Sylvius and Rolando a line is drawn through the naso-frontal suture and the lambda, passing 6 cm. above the external auditory meatus.

The cerebral centres definable by these lines are discussed by the author as well as the localization of the more important sinuses from a surgical standpoint, particularly the spheno-parietal sinus. For the localization of the cerebellum as well as the posterior portion of the transverse sinus P. draws a line from the upper edge of the zygomatic arch to the external occipital protuberance. Below this line the localization of the cerebellum is to be fixed and above it the transverse sinus.

In order to determine whether or not these lines hold good in the cranium of the infant, P. examined the skulls of twenty children. As a result of this investigation he determined that no absolute variation existed so far as the fissure of Rolando is concerned: the fissure of Sylvius, however, exhibited decided variations compared to the adult head. This furrow was found to be situated relatively higher to the temporal suture and first and second convolutions than in adults. This difference, he considers to be due, not so much to a difference in the development of the encephalon as to that in the cranium.

A most important portion of the author's work relates to the rules governing the indications for operation for exploratory trephining. Cerebral abscess is ably discussed, particularly those foci of suppuration developing after suppurative inflammation of the middle ear. He declares that 70 per cent. of these were located in the temporal and 30 per cent. in the occipital region. In order to reach the former the author proposes to trephine at a point 3 cm. in a vertical line above the external auditory meatus. This differs from von Bergmann's point which is somewhat posterior to this line: while Macewen's is

nearly on this line but at a greater distance from the meatus. In order to reach abscesses in the cerebellum the author recommends the trephine to be applied midway on a line drawn from the point of the mastoid process to the occipital protuberance.

In the matter of spontaneous cerebral hemorrhage the author agrees with Erd in condemning Horsley's proposal to ligate the carotids. The trephine is advocated by P. in hydrocephalus.

In puncture of the ventricles he recommends the trephine to be placed 4 cm. directly above the external auditory meatus for the reason that better drainage can be obtained from this point than when the puncture is made from the occipital direction: nor does refilling occur as rapidly as when approached from the frontal. Horsley's and Brinkhardt's work in this line of operative interference in cases of purely nervous and psychical disturbances is but barely noticed.

As to the technique of the operation P. follows essentially the rules of the present day. He lays stress upon the hypodermic use of morphia prior to the administration of chloroform, claiming that it procures contraction of the vessels. In establishing the incision he he lays more stress upon the necessity of providing proper nutrition for the flap than drainage, hence as a rule the base is directed downwards. In stating the error which may occur he declares that it does not exceed 2 cm. The cavity of the dura is opened by a flap rather than a cross incision. The use of the thermo-cautery is deplored in cerebral surgery, hemorrhage being arrested by tampons of iodoform gauze. The method of temporary resection of the skull devised by Wagner is modified by P., the horizontal lines of the omega-shaped incision being omitted.

The concluding chapter of P's work includes a description of some osteoplastic operations upon the skull, remarks upon the technique of craniotomy, a discussion of trephining the mastoid, etc.

Le Fort's preference for purposes of localization is for six points or landmarks, namely, the glabella, external occipital protuberance, the superior and posterior edge of the zygomatic process of the frontal bone, middle of the zygomatic arch, the point of junction of the occipital parietal and temporal bones (junction of the lambdoidal and parieto-mastoid sutures) or asterion of Broca. The following lines are



then drawn : commencing at the glabella, a line passes to the external occipital protuberance. On this line 67 to 70 millimetres from the protuberance, the lambda or point of union of the sagittal and lambdoidal sutures, is located, the uppermost limit of the fissure of Rolando is also situated at this point. The distance of the latter point from the glabella varies from 154 to 191.5 millimetres. The entire length of the sagittal line, nasion toinion, varies from 29 to 36 cm. in the adult head. The direction of the fissure of Rolando is indicated by a line drawn from the middle of the zygomatic arch in a direction to intersect the sagittal line at the lambda. A third line is drawn from the zygomatic process of the frontal bone to the lambda. The fissure of Sylvius is localized, as follows : Starting from a point 2.7 cm from its beginning 4 to 6 cm are measured along this line. The lower limit of the fissure of Rolando is found at a point 10 to 15 millimetres above the intersection of this third line with that upon which the last named fissure is located (the second line). Finally, Le Fort identifies the motor centres of this region by lines drawn from the asterion to the lambda and upper angle of the fissure of Rolando. In corroboration of the reliability of these lines Le Fort trephined the skulls of cadavers with the result of varying in no instance more than six millimetres from the motor centre intended to be reached. It would, therefore, seem that in the hands of their originator the employment of these points and lines of Le Fort are fairly successful in localizing those motor centres of the brain which in recent years have been the subject of special study by Ferrière, Horsley, Broca, Championnière and others. But it is to be very much doubted if the same success will follow their use in the hands of others. This is to be attributed mainly to the difficulty involved in locating some of the points upon the surface. For instance, one can scarcely believe the author is justified in stating that the asterion or junction of the occipital parietal and temporal bones can be easily identified by the sense of feeling. The attempt at identification of the middle of the zygomatic arch will likewise be conceded to be more or less a matter of guess work.

# INDEX OF SURGICAL PROGRESS.

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## GENERAL SURGERY.

**I. Pental.** DR. E. WEBER (Halle). Pental (C H.<sub>3</sub> C H.<sub>3</sub> C H.<sub>3</sub> or pure tertiary amylen) was administered in more than 200 operations in the University clinic at Halle. A moderate state of excitement was observed only in a few cases, these being chlorotic and hysterical; extreme excitement occurring only in alcoholic subjects. Sometimes, in addition to the slight excitement tetanic spasms of the arms and legs occurred. There were no unpleasant after-effects nor was any important influence upon the heart or pulse noticeable, the corneal reflexes ceased late in the administration. From 5 to 10 grammes inhaled (the apparatus used being a modification of Junkers) sufficed to procure in most instances, anæsthesia in from 2 to 3 minutes, which state, however, lasted but a short time. The operative procedures under pental anæsthesia were of a minor character such as extraction of teeth, incision of bubos, removal of condylomata etc. For extending fixed joints pental did not suffice as the anæsthesia was not sufficiently deep to relax all the muscles involved.

Brewer of Vienna found resuscitation necessary in 1 out of 100 cases of anæsthesia from pental.—*Münchener Med. Wochenschrift*, 1892. No. 7.

**II. An Experimental Contribution to the question of the Treatment of Anthrax.** By DR. F. NISSON. Nisson attempts to ascertain how far, in case of anthrax of the skin, a procedure is justified which radically attacks the primary focus of infection by means of the knife or Paquelin's cautery. N. inoculated, at the end of one extremity or at the point of the ear, blood of mice infected with anthrax and performed some hours later high amputation of the leg or of the whole external ear. He found that such an operation,

performed 2 or 3 hours after the inoculation did not have any influence on the course of the infection. The regularity and relative slowness that characterized the passage of the bacilli into the body, as was shown by the above mentioned experiments, pointed to the lymph channels as the probable course followed by the anthrax bacilli. The author, therefore, several hours after inoculation of the anthrax germ in the end of an extremity, dissected out the next adjacent lymphatic glands and inoculated them into white mice. Death of the mice took place and in this way it was demonstrated that anthrax could be inoculated from an animal 3 hours after the reception of the disease. The author recommends, on the basis of these observations, an expectant and not operative treatment of anthrax of the skin for the reason that it is not possible to remove all the anthrax germs from the body by dissecting out the place of inoculation. The course of the disease varies greatly in different individuals. Finally N's experiments attempted to determine whether or not by ligating an extremity the peripherally inoculated bacilli can be kept back at the place of inoculation. He inoculated and simultaneously established, above the inoculated point, a ligature upon the limb. The rubber tubing employed, after 3 to 4 hours, was removed and the actual cautery applied to the infected wound. None of the animals thus experimented upon showed any symptoms of the disease. These animals were subsequently inoculated and found to be susceptible to the disease. The circular ligature of the part and cauterization, therefore, thus far have proven to be the most successful means of coping with the disease.—*Deutsch. Med. Wochenschrift*, 1892, No. 53, p 1425.

**III. Treatment of Lupus of the Skin.** By Dr. W. KRAMER. K. advocates excision of lupus of the skin. He used this radical method ten times in the last two years, and in not a single case was recurrence observed, either at the place of operation or in its neighborhood. The patients were suffering from lupus of the face or neck, ranging from the size of a twenty-five cent piece to that of the palm, the outlying portions being raised as well. In all the cases the diseased portion was circumsised, the knife passing one centimetre from its limits and deeply to or into the muscles, bone or

cartilage, the lupus, together with the subcutaneous tissue, being completely extirpated, after careful arrest of hemorrhage by compression or ligature. In four cases the wound was sutured; in three instances, where suturing, on account of excessive tension of the wound edges, was but partly practicable, secondary suturing was practiced. Thiersch's method of skin transplanting was employed, and in one case a plastic operation was performed. The course of healing was aseptic and required from one to four weeks. The cosmetic result was very satisfactory. K. recommends the employment of extirpation as early as possible, but he claims that even in cases of advanced disease lupus excision may be followed by relatively good cosmetic results. The methods of transplantation, implantation and plastic method now employed have contributed largely to the success obtained in this class of cases at the present time.—*Centbl. f. Chir.*, 1892, No. 8.

GEORGE RYERSON FOWLER (Brooklyn).

### SURGICAL ANATOMY.

**1. The Ileo-Cæcal Appendix.** By Dr. CLADO (Paris). As a result of his researches the author concludes that the appendix in man is a portion of the atrophied cæcum; it does not possess valves, and the meso-appendix which binds it to the cæcum and the small intestine descend usually to its point; the peritoneal fold is sometimes filled with fat. In the female the meso-appendix has a prolongation which is lost in the broad ligament (appendiculo-ovarian ligament); it encloses the lymphatics, which establish a communication between the appendix and the ovary.

Clado found a ganglion in the angle made by the appendix and the cæcum with the small intestine: it is constant and of the size of a bean. Its hypertrophy has been demonstrated in typhoid fever, tuberculosis and appendicitis. The lymphatics of the appendix are to be found in the appendicular ganglion.

The appendix is on a level with the lesser pelvis, sometimes in the iliac fossa; in one out of ten cases it is folded above on the posterior surface of the cæcum.

The structure of the appendix is similar to that of the large intestine; from without inwards are to be found the peritoneal investment, long, smooth, muscular fibres, circular fibres, then a tolerably thick layer of cellular tissue with arterial openings and lymphatic depressions, then a mucous coat, doubled with a thin "muscularis mucosæ," and lined with cylindrical epithelium. The appendix is composed of glandular tissue which is found in spots of flat or round follicles.

Clado has had opportunity to study the appendix from the third month of intra-uterine life, in a state of health and immediately after death. He has invariably found in the appendix the common "bacterium coli." He has likewise met with it in three cases of appendicitis. This affection is, according to our author, an inflammation of the glands leading up to an intra-appendicular abscess. This is possibly the outcome of a microbial migration demonstrated in one case through the wall or a perforation.

The frequency of perforation at the extremity of the appendix is explained by a difference of structure at this point. When the appendix folded under the cœcum is diseased by abscess the lesion can be taken for a typhilitis or a perityphilitis. Finally the lymphatics of the appendiculo-ovarian ligament favor the propagation of inflammations of the large ligament to the iliac fossa.

Clado regards the appendix in the light of a gland rather than as an organ of absorption. Retterer, who has made as many researches on this subject as Clado, likens the appendix to a tonsil.—*Revue de Chirurgie*, 1892, March.

GEORGE RYERSON FOWLER (Brooklyn).

## NERVOUS AND VASCULAR SYSTEMS.

**I. Resection of the Obturator Nerve for the Relief of Contractures of Central Origin.** By Dr. CARL LAUENSTEIN (Hamburg). L. details the case of a patient suffering from chronic myelitis. In addition to a severe cystitis, a contracted condition of the adductors of the thigh was the occasion of severe suffering. The knees were forced together so powerfully that it was found

almost impossible to separate the thighs. As but slight or no hope of the recovery from the myelitis existed, L. sought to relieve the patient of her sufferings resulting from the contracture of the adductors by a resection of both obturator nerves. The operation was entirely successful in fulfilling its object. Besides relieving the pressure of the knees upon each other, the separation of the thighs permitted proper treatment by irrigation, etc., of the bladder affection.

The following method of procedure is recommended: A longitudinal incision is made parallel with and to the inner side of the trunk of the saphenous vein, upon the anterior surface of the thigh, extending from the pubic tubercle downwards. The skin, cellular tissues and fascia being separated the external edge of the long adductor is brought into view and identified by its thick belly. On the outer side of the long adductor the pectineus is observed, passing in obliquely from above and toward the median line downwards and outwards. Separation of the pectineus in the direction of its fibres reveals the obturator muscle, and under the thin fascia of the latter the fan like diverging branches of the obturator nerve, passing from above and outwards in a direction downwards and inwards, almost at right angles to the course of the pectineus fibres, are found. A blunt retractor, deeply placed, making strong traction upon the external edge of the wound will enable the operator to identify the trunk of the nerve, which may be grasped and secured by means of a silk ligature. As much of the nerve as may be desired may now be removed by means of the scissors. The accompanying vessels can be protected without difficulty while the nerve is being isolated.—*Centbl. f. Chirg.*, 1892, Vol. xix., No. 2.

## HEAD AND NECK.

**I. Lumbar puncture for relief of Hydrocephalus.** By Dr. QUINCKE. Q. performed puncture of the subarachnoid space in the lumbar region in ten cases, histories of nine of which are given. The operation was suggested by the possible existence of increased pressure of fluid in the cerebro-spinal cavity. The height of pressure, in cases of children operated upon in this manner, was from 70 to 470

millimeters of water; in adults from 150 to 680 millimetres. The normal pressure in adults is not known; in children 70 millimetres may be considered not excessive, physiologically.

The absolute height of pressure did not correspond to the gravity of the symptoms. The rapidity of the increase and the condition of the heart likewise play an important part; in case of powerful heart action even a greater pressure will not interfere greatly with the circulation in the brain. The quality of the fluid removed was usually normal; sometimes the percentage of albumen was somewhat increased, while the quantity of fluid varied in adults from 20 to 100 cubic centimetres, and in children from 2 to 66. The results are as follows: One case was cured; in two others, the results was probably due to the other measures employed; in three cases temporary improvement was observed; in four cases the operation evidently exerted no influence. The indication for lumbar puncture cannot as yet be definitely stated, though, generally speaking, the operation is indicated when the increase of pressure becomes alarming and, in case of chronic exudation, in order to bring about an alteration in the conditions of resorption. This result may be expected only in the minority of cases. Unpleasant accidents did not occur in any of Q.'s ten cases. The puncture is made in the third or fourth intercostal space of the lumbar portion of the vertebral column: in children the intercostal spaces are relatively larger. In adults the spinal processes lose their horizontal direction and assume a vertical direction, thereby increasing the difficulties of puncture. The incision is made from 5 to 10 millimetres from the median line; the needle is introduced in a slanting direction, the point reaching the region of the dura in the median line. In children the needle passes 2 centimetres deep; in adults from 4 to 6.

The canula is connected with a glass tube by means of rubber tubing in order to ascertain the exact height of pressure.—*Berlin klin. Wochenschrift*, 1891, Nos. 38 and 39.

GEORGE RYERSON FOWLER (Brooklyn).

**II. Trephining for Epilepsy.** By Dr. P. SODENBAUM. A young man, 19 years of age, was struck when 5 years of age by a falling tree. When 8 years of age developed vertigo and finally fits of

unconsciousness of two minutes duration. Once had a typical epileptic seizure. Operation November 18, 1890. A depression extended from a point 6.5 cm. above the left mastoid process 5.5 cm. upward. It varied in width from 5 cm. at its lower part to 3 cm. at its upper portion, and no bone could be felt. Pulsations isochronous with the heart were present. Two incisions through the soft parts were made. The piamater was oedematous; the cerebral substance was apparently sound. A few incisions were made into the latter. Healing per primam. In three days following the operation he had seven attacks of typical epilepsy, but later was free from both typical epilepsy and petit mal. He had one fit in August and one in September.—*Centralblatt für Nervenheilk.*, September, 1892.

SAMUEL LLOYD (New York.)

**III. The Treatment of Cicatricial Stenoses of the Œsophagus.** BY DR. WILLY MEYER (New York). The author after detailing two cases, and discussing at length the various phases of the subject, submits the following conclusions:

1. After swallowing acids, etc., sounding should be begun as soon as it can be made out that the internal wounds have healed, certainly not later than two to four weeks after the accident. This prophylactic treatment has to be continued at regular intervals for a long period—if necessary, for life. Gastrostomy can be primarily performed for this purpose (Maydl, von Hacker).

2. If a stricture of the œsophagus has developed and is impermeable from the mouth, the patient should be submitted to an operation as early as possible. No forcible dilatation or boring with the sound should be permitted. If the latter is done, the formation of a false passage is favored. The œsophagus has thus often been perforated.

3. External œsophagotomy for the establishment of a temporary fistula in the neck (œsophagostomy) will be found useful and sufficient in many of these cases, especially in children. The stricture can be generally passed quite easily from this opening. A tube can be left *in situ* without the annoyances which are caused by passing it through the nose and pharynx. This operation is always indicated if, besides an impermeable stricture in the lower portion of the œsophagus or



behind the bifurcation of the trachea, a second (or third) one is present at a level with, or not far below, the cricoid cartilage.

4. In grown patients and those who are emaciated and require immediate forcible nutrition, primary gastrostomy, with subsequent retrograde sounding, may be preferable.

5. If the stricture has been successfully stretched, and if the same sound which passed from the wound in the neck can also be pushed down through the mouth, the fistula has to be closed. If gastrostomy had been performed, this second operation generally requires laparotomy and separate suture of stomach and abdominal wound.

6. In a number of cases there is a limit to stretching and division, or the repeatedly widened stricture rapidly recontracts. Then internal œsophagotomy is indicated as the only means to cure the patient.

7. Internal œsophagotomy, if performed under these circumstances, is a very dangerous operation, especially on account of our present lack of means to render the operating field free of infectious material.

8. A thorough disinfection of the intra-thoracic portion of the œsophagus seems feasible by first adding gastrostomy to external œsophagotomy, and *vice versa*. Then the operating field and the stomach can be cleansed by antiseptic irrigation before and after the operation. Through temporary antiseptic tamponade of the cardiac portion of the œsophagus and of that between the fistula in the neck and pharynx we may hope to guard against contamination of the wound.

9. From a wound in the neck internal œsophagotomy can be carried out in the same way and with the same instruments as used for dividing strictures of the anterior urethra from within. The division should be made in a retrograde way only, the knife having been first passed beyond the stricture. A guide pushed up from the gastric fistula will help to accomplish this, even in obstinate cases. It may become necessary, especially in adults, to have an instrument of a special length, and sometimes also curve, constructed for this purpose.

—*N. Y. Med. Jour.*, Nov. 19, 1892.

## ABDOMEN.

**I. On Tumors Caused by Effusions into the Lesser Peritoneal Cavity Simulating Cysts of the Pancreas.** By JORDAN LLOYD, F. R. C. S. (Birmingham). The author details two cases of injury to the pancreas followed by accumulations of fluid in the lesser peritoneal cavity and the formation of a tumor in the left hypochondriac region, extending toward the umbilicus. Postmortem examination in one case, and operative exploration in the other demonstrated that in both the tumor was due to an accumulation of fluid in the lesser peritoneal cavity. He then reviews the literature of pancreatic cysts of traumatic origin, and concludes that in these cases the diagnosis of pancreatic cyst has been made on insufficient evidence, and that all the published cases are in reality cases of fluid effusions into the lesser peritoneal sac, the result of injury to the underlying pancreas, and not cysts of the pancreas in the proper meaning of the term. He calls attention to the fact that pathological distension of the lesser peritoneum gives rise to a tumor in the left hypochondriac, epigastric, and umbilical regions of a somewhat characteristic shape, but which appears to vary from time to time in form and size according to the condition of the overlying stomach, for when the viscus is full of liquid contents it increases the area of the tumor's dullness, whilst it makes its outline less definable by palpation, and if the stomach is distended with gas the dull area becomes resonant, and apparently the tumor may disappear altogether. The colon always lies below the tumor, and never in front of or above it, as is the case in kidney enlargements. The stomach is most readily distended with gas by giving a few grains of carbonate of soda and immediately afterwards a little tartaric acid, and the colon is best distended with water by injection *per rectum*. The downward limits of this space vary in individuals according to the extent to which the two layers of the great omentum remain separate, and in such cases the sac may distend so as to occupy the loins or even to fill the whole abdominal cavity.

In these cases pain is an uncertain symptom. It has usually been paroxysmal in character, coming on at irregular intervals and continuing for variable periods. It is referred to the epigastrium, strikes

through to the back, and is sometimes aggravated by the taking of food. Vomiting is usually met with. It varies very much as regards frequency and its relation to meals—it may be almost continuous for a long period, or it may come on at irregular intervals only. Emaciation is a conspicuous feature, and is more than the vomiting is sufficient to explain. Anæmia has been marked in each of the author's cases. It disappeared with surprising rapidity after operation in the patient who recovered. The dullness over the left lower ribs posteriorly is an interesting sign. The cavity could easily be tapped by a needle introduced from behind, and might give rise to the belief that the fluid was in the pleural cavity. The heart may be lifted up by the underlying tumor, so that the apex beat is raised as high as the fourth intercostal space, as was seen in his second case, and also in that recorded by Senn. This displacement might easily be wrongly attributed to the presence of fluid in the left pleura. Cardiac pulsation, too, may be transmitted to the abdominal swelling. In both of the author's cases the temperatures were subnormal throughout, although in Case 1 *post-mortem* examination showed that some amount of general peritonitis was present.

In neither of the cases did the urine at any time contain sugar, but in both a little albumen and phosphates were present.

In closing this paper Mr. Lloyd submits the following conclusions:

1. That contusions of the upper part of the abdomen may be followed by the development of a tumor in the epigastric, umbilical, and left hypochondriac regions.

2. That such tumors may be due to fluid accumulations in the lesser peritoneal cavity.

3. That when the contents of such tumors are found to have the property of rapidly converting starch into sugar, we may assume that the pancreas has been injured.

4. That many such tumors have been regarded as true retention "cysts of the pancreas," and that this opinion has been formed upon insufficient evidence.

5. That the diagnosis of distention of the lesser peritoneal cavity before operation can usually be made by the characteristic shape of the swelling.

6. That early median abdominal incision and drainage is the safe and proper treatment.—*British Med. Journ.*, Nov. 12, 1892.

**II. Serous Cysts of the Mesentery.** By Dr. TERILLON (Paris). The difficulties of diagnosis in cases of mesenteric cysts have been considered, heretofore, almost insurmountable. T. on the basis of three observations, in this class of cases, gives the following diagnostic points.

Serous cysts are generally located in the median or lateral portion of the abdomen and are not connected with the organs which, as a rule, form the place of origin for cysts, *i. e.*, liver, kidney and ovary: in case of a very large cyst, however, the absence of such a connection is difficult of demonstration. Anteriorly or on the sides of the tumor an adhesion is found with a loop of bowel that cannot be detached: percussion, therefore, will frequently elicit a superficial tympanitic sound. The cysts can sometimes be detached, especially in a transverse direction. Their fluctuation is well marked even in cases of great tension. Their size varies. As soon as they are clinically demonstrated their contents average from three to six litres of slightly colored serum. The very excessive connections of serous cysts of the mesentery, the ætiology of which the author declares to be very obscure, renders their enucleation, as a rule, impossible or at least extremely dangerous. Simple puncturing through the abdominal walls involves danger of injury to the bowel and is often followed by recurrence. T., therefore, recommends laparotomy without previous puncture, removal of the sac as far as possible, suturing of the edges of the wound of the sac to the abdominal wound, and drainage or tampons. Several months' elapse before the resulting fistula is finally closed.

In three cases occurring in females of 18, 22 and 23 years of age, respectively, T. made the diagnosis upon the basis of the above described characteristic symptoms. Recovery followed laparotomy and suture of the cyst wall as suggested in the communication.—*Bull. et mèm. de la soc. de Chirg. de Paris*, t. XVII, p. 375.

**III. Treatment of Wounds of the Intestine.** By Dr. CHAPUT. Ch. condemns, in a most unqualified manner, the expectant treatment of wounds of the intestine, the mortality of which is from 50 to 60 per cent. The hitherto unpromising results obtained by laparotomy are attributed to either a late application of this procedure, the overlooking of perforations or imperfect suturing. In dogs, invariable success followed his efforts, in the repair of wounds artificially produced, by means of laparotomy.

Senn's method of ascertaining whether or not perforation exists by forcing hydrogen gas into the bowel through the anus and identifying the presence of the latter at the abdominal wound by lighting it as it escapes, is rejected by Ch., on the ground that considerable force is necessary to drive the gas beyond the ileo cœcal valve, and when this is accomplished the sudden influx of the gas from the distended colon will convert incomplete perforations into perforating wounds, or separate commencing adhesions. Exploratory laparotomy is preferred to Senn's diagnostic method, each portion of intestine being carefully and systematically gone over, from the ileo-cœcal valve to the duodenum; the stomach and larger intestine being examined last. Each perforation is grasped by means of clamp forceps as soon as it is discovered: suturing of all the perforations is done afterwards.

In cleaning the peritoneum dry sterilized sponges are used, and all antiseptic fluids dispensed with.

In case of excessive hemorrhage, Ch. follows Senn's proposal and makes digital compression of the aorta until the bleeding points are identified and secured.

In closing intestinal wounds amounting to more than one-fourth of the circumference of the bowel Ch. recommends his methods of transplantation of intestine ("greffe intestinal"). This consists essentially in closing the perforation with a healthy loop of intestine. For this purpose a point in the intestinal track is selected fifteen to twenty centimetre above or below the perforation, bringing this in contact with the wounded intestine and securing the two together by a double row of sutures. In case of double perforation a double transplantation may be employed and resection of the injured bowel be avoided. Should two perforations occur close beside each other it is

better to form one large opening by removing the portion lying between the openings, and transplant as before.

The method of transplantation here suggested is based upon an experimental study in eighteen animals. In all eighteen cases the transplantation was successful.—*Gaz. des hôpitaux*, 1892, No. 138.

**IV. Tuberculous Strictures of the Bowels and Their Treatment.** By DR. F. KÖNIG. K. observed and operated upon five cases of tuberculous stricture of the bowel, a disease, the clinical appearances of which are so typical as to present a picture with striking characteristics. The patients' ages varied from twenty to forty years, only exceeding this in one case. In this a woman of fifty-two years. The patient had suffered from gastric symptoms which developed slowly; pallor and emaciation appearing simultaneously. Later there occurred attacks of colicky pains pointing without doubt to stricture of the bowel. With varying frequency, several times a day and again less often, the abdomen became the site of painful distention; loops of bowel with serpentine movements and a splashing noise is noticed upon succussion. The attack terminates by the contents of the bowel being forced through the stricture; in the meantime a characteristic noise as if a fluid is pressed out of a syringe becomes audible upon auscultation. Immediately the abdomen flattens and the patient is relieved for a time. Operation discloses conditions corresponding to the picture of the disease. The stricture of the bowel originating from the tuberculous ulcer of the bowel is found with considerable lessening of the lumen from cicatrization. Above this point the bowel is greatly dilated with hypertrophy of the muscular coat; below, the bowel is contracted or rather atrophied. Typical circular resection of bowel for the removal of the obstruction is indicated as well as removal of the affected mesenteric glands. This procedure is justified by the fact that, as a rule, the tuberculous affection of the bowel in these cases is circumscribed and localized and, as shown by the cicatrization, has an intrinsic tendency to recovery. The diagnosis of a stricture due to tuberculosis will sometimes be suggested by other existing tuberculous affections. Two out of K's five patients died soon after the operation: one from asthenia and one

from peritonitis due to failure of the suture of the bowel; one of three patients who recovered was in good health two years afterwards; the two others were operated upon more recently. These, likewise, had gained very much in general health and weight.—*Deutsche Zeitschrift f. Chirg.*, Bd. XXXIV., p. 65.

**V. Primary Sarcoma of the Small Intestine.** By Prof. Dr. MADELUNG (Rostock). Sarcoma attacking primarily the walls of the stomach or intestine is comparatively a very rare disease. This is particularly true of primary sarcoma of the small intestine, heretofore scarcely mentioned in the literature of malignant disease. The development of the tumor in this connection is peculiar, and this, together with the appearances presented, differ greatly from those presented by other neoplasms of the bowel. The author, on the basis of three cases occurring under his own observation, and of eleven cases collected from various sources, presents the following sharp characterization of the disease:

Sarcoma of the small intestine belongs, in most instances, to the round-cell variety, with small cells, and rarely to the spindle-cell type of the disease. They, in all probability have their origin in the sub-mucous layer, and spread in this by preference. The muscular structure is the next to be invaded, and later the mucous membrane; the peritoneum is very rarely attacked, even in advanced cases. As a result of this peculiarity of the method of invasion of the muscular structure of the bowel, the latter becomes paralyzed, and the diseased portion is dilated so as to remind one of an aneurism. Narrowing of the lumen does not occur, even if the mucous membrane becomes extensively diseased. In consequence of the dilatation excessively large tumors are formed early.

Should the tumor force its way through the serous covering, large and irregular intra-peritoneal abscesses with fecal matter as a portion of their contents arise. Metastatic formations in the lymphatic glands of the omentum and mesentery, as well as in the liver and kidneys, occur early. In one instance the small intestine was attacked in two separate places.

The etiology of the disease was not suggested by anything in the histories. In one instance a severe blow upon the abdomen preceded the development of the disease.

In only a single instance among the fourteen was the disease opened in the female. The majority of cases occurred during the third and fourth decade of life; in only three cases the fortieth year had been passed.

A notable characteristic is the slight local disturbance compared with the rapid progress of the general disease. General loss of strength and weight, and other evidences of considerable impairment of the general health were observed before slight gastric disturbances and local pain called attention to the abdomen. Persistent constipation even is not a feature of the disease unless brought about by some special complication; in this respect there is apt to be an alternation between the two conditions of constipation and diarrhœa.

Another peculiarity of these growths is the fact that they remain more or less distinctly circumscribed and mobile for a comparatively long time. They grow with extreme rapidity, are generally of a hard consistency, although sometimes the centre seems soft and almost fluctuating.

The duration of the affection is usually very short. The shortest duration in M.'s series was but a fortnight; the longest period was twenty-one months; an average of nine months was observed.

Death generally takes place as the result of exhaustion, particularly in cases of intra-peritoneal abscess. One patient died from invagination. The portion of intestine attacked by sarcoma became invaginated, afterward gangrenous, and was finally passed per rectum. In one instance the bowel became rotated upon its own axis at the site of the disease.

The diagnosis of the affection during life differentiating it from other forms of abdominal tumor may be made upon the basis of the above mentioned characteristics. Exploratory laparotomy will serve to clear up the matter. In making the differential diagnosis, the time of life of development, the local symptoms (large size of tumor, etc.), the rapidly developed cachexia, and the absence of stenosis. Perforation and formation of fecal abscesses having occurred, the ap-



pearances, both local and general, resemble those of certain cases of tuberculosis of the peritoneum.

Operation in this class of cases is, as a rule, out of the question. The early formation of metastases forbid interference. Of two patients operated upon by Nicolaysen and Mikulicz, the patients survived the operation. The only record to be found concerning the after histories of these patients consists of the statement that the first was living on the twenty-fifth day after the operation, and the other that he was alive on the fifteenth day. M. operated upon two cases. In one case the procedure advanced no further than an exploratory laparotomy, from which the patient died nine days subsequently. The second case died twenty-four hours following an extirpation of the tumor. The autopsy revealed extensive and advanced metastatic deposits in the liver and omentum.—*Centralblatt f. Chirg.*, July, 1892.

**VI. Tuberculosis of Herniæ.** By Prof. Dr. BRUNS (Tuebingen). Tuberculosis is the rarest pathological change of a hernia. B. adds one new case to the twelve already published. Of these thirteen the hernial sac was attacked ten times and in seven it was alone the seat of the disease. This, together with other conclusions, substantiate the belief that "tuberculosis of herniæ may occur as a primary disease; generally, however, it is associated with general peritoneal tuberculosis.—*Beiträge zur klin. Chirg.*, Bd. IX., p. 209.

**VII. Treatment of Strangulated Herniæ when Gangrene is Imminent.** By Dr. THORNHILD ROVSING (Copenhagen). The method, described and recommended almost simultaneously by Graefe and the author, consists in pulling forward the suspicious loop of bowel (having broken up the adhesions) and suturing it to the abdominal wall. The sutures should be of catgut or silk and only include the serous membrane or layer of the bowels. Then dress the bowel with sterilized gauze, wait developments; if the loop return to its normal condition, remove the suture, replace the loop and the interrupted herniotomy is completed. In case, however, gangrene occurs either resect the bowel or establish an artificial anus. The reason that this simple method was not recommended and practiced

earlier was in consequence probably of the fear that the very act of dragging out the bowel might favor the development of gangrene. The two cases of Rovsing and Graefe prove that even very suspicious loops incarcerated for several days may recover under this treatment. —*Centralblatt f. Chirg.*, 1892, July 16.

**VIII. Treatment of Gangrenous Herniæ.** By Dr. POULSEN (Copenhagen). P. long ago advocated the establishment of an artificial anus instead of resection in case of gangrenous herniæ. He still adheres to this opinion knowing that resection was generally followed by better results, but he claims that the establishment of an artificial anus will yield better results if his own method of procedure be adopted. The technique is as follows: after opening and irrigating the hernial sac, enlarge the incision in the abdominal wall two to three centimetres; then draw out the bowel and suture (through the serous coat only) it to the abdominal wall, so that from five to fifteen centimetres of healthy bowel be exposed. Should perforation occur, close this exposed part with Péan's forceps and wrap in iodoform gauze. After one or two days the loop is destroyed by the thermo-cautery, the enterotome used and enteroplasty performed. P. treated five cases of gangrenous herniæ by the above method. Of these three were cured and two were fatal.—*Centralblatt f. Chirg.*, 1892, No. 30.

**IX. Treatment of Strangulated Gangrenous Hernia.** By Dr. JULES MARIN (Paris). Primary resection and suture is advocated very decidedly, in the treatment of gangrenous hernia and the formation of a preternatural anus unqualifiedly condemned. The argument is brought forward that collapse in consequence of strangulation followed by gangrene is rare in strong persons in middle age, and therefore can but seldom contra-indicate enterectomy and suturing. The author describes a procedure proposed by Chaput and Duchamp, the essential point of which is the immediate removal of the spur resulting from an artificial anus, by primary longitudinal splitting and subsequent suturing. After circular resection of the gangrenous portion, with or without cuneiform excision of the mesentery, both open ends

of the divided bowel are placed side by side. In each a longitudinal incision of from six to eight centimeters is made, one to two centimeters distant from the insertion of the mesentery. Then the four edges of the two longitudinal splits in the intestine are sutured so that both lumina of the bowel freely communicate. After this suturing (longitudinal enterorrhaphy) the two ends of the bowel form a condition like a pair of trousers, whose common upper broad opening still requires closing. This closure may be made completely or a small opening may be left as a kind of safety-valve, and its edges sutured to the hernial sac. The latter course is usually preferred by Chaput and Duchamp, the fistulous opening which results closing spontaneously or subsequently requiring but a slight freshening of the edges, and suturing. This course involves complete renouncing of the method of reposition of the closed bowel.

The disadvantages to which this portion of the procedure may lead is shown by the course pursued by a case operated upon by Duchamp. The symptoms of strangulation did not cease, and it was only after the introduction of a catheter through the fistula into the upper end of the bowel that fecal matter escaped. An artificial anus resulted, which was closed by a later operation. The cause of this complication resided in the narrow canal itself. The pressure exercised upon the walls of the ends of the bowel prevented the escape of fecal matter from the opening, as well as communication through the slit in the spur. M. in order to avoid this, recommends either reposition of the completely sutured intestine or a greater length than eight centimeters to the longitudinal slit.

The first patient operated upon by Duchamp recovered without any disturbance of the course of healing whatever, the small fistulous opening closing spontaneously. In Chaput's case the cure of an artificial anus, which had resisted other measures, was attempted. The patient from excessive weakness proved to be an unfavorable subject for operation, and died two days afterwards. The autopsy showed no sufficient cause of death, no peritonitis existed.—*Brochure*, 1892.

(The value of this method can only be determined after more extensive trials. It should be said, so far as the remark concerning the rarity of collapse following strangulation and gangrene of intestine

is concerned that experience does not bear out the assertion made. Collapse does occur, and that rather frequently. So pronounced has this been in several instances that I have been constrained to deny the patient a general anæsthetic and have operated under cocaine instead. There can be no question that the fate of the patient frequently depends upon the rapid completion of the operation. As to the length of the slit in the spur: this should be not less than ten centimeters after the parts are entirely healed.)

GEORGE RYERSON FOWLER (Brooklyn.)

### EXTREMITIES.

**I. Subperiosteal Excision of the Tarsus, and of the Proximal Extremities of Fourth and Fifth Metatarsal Bones for Caries, with Perfect Preservation of the Shape and Functions of the Foot.** By Dr. DON EMILIO REINA G. MARTIN (Spain). The patient, a child eight years of age, had a tubercular anthritis of the ankle-joint, with numerous fistulæ on dorsal and plantar surfaces of the foot. Two large incisions along the foot starting underneath the malleoli and terminating in the distal quarter of the first and fifth metatarsal bones were made and then two vertical incisions were made to increase the room. All the soft parts of the dorsal region were dissected up and the diseased bones were excavated by gouge and trephine. The calcaneus, astragalus, scaphoid, cuboid and the proximal extremities of the fourth and fifth metatarsal bones were scooped out with the exception of the thinnest possible shell, which was retained as a "mould" for the periosteum and to aid in the regeneration of new bone. An aperture for drainage was made in each bone. The bone cavities were carefully disinfected, drainage tubes inserted, the soft parts sutured, and an iodoform poultice and a retentive dressing was applied.

The foot is now perfectly healed, of normal shape and length, with the exception of a slight contraction of the calcaneus which renders the heel slightly less prominent than normal. The functions of the joints and foot are normal.—*Revista Medica de Sevilla*, Dec. 15, 1891.

SAMUEL LLOYD (New York).

## GENITO-URINARY.

**I. Idiopathic Pre-vesical Cellulitis.** By DR. ENGLISH (Vienna). Twenty-three cases of this affection from the literature of the subject were studied by the author. In addition to this he observed seven cases in his own experience. The disease occurs most frequently in males, and at ages ranging from twenty-five to thirty years. The origin of the affection, in all probability, depends upon infection, and it is more than likely that scrofula or tuberculosis plays an important role in its etiology. The symptoms may be divided into two groups, corresponding to two stages of the affection. It begins with symptoms which are not all referable to the pre-vesical space, including constipation, subsequent diarrhoea, urgent gastric symptoms, etc. Severe intra-abdominal disturbance is suggested by the symptoms. Between the second and twelfth day localized symptoms arise, such as pain and the characteristic tumor. The latter suggests by its appearance an over-filled bladder. It rises from below upward, is sharply circumscribed, but differs in shape from the bladder by presenting a triangle with its base uppermost, and the point of which disappears behind the symphysis pubis. The most certain method of establishing the character of the tumor, however, is by the use of the catheter. Participation of the bladder may occur secondarily, however, this leading to retention in some instances. The inflammatory process may spread from the pre-vesical space in all directions, reaching to the thigh, extending with the pelvis, and may terminate in resolution or suppuration. The latter termination is not so frequent as is generally supposed. When it does occur and passes unrecognized, rupture of the abscess cavity may occur into the bladder, vagina, urethra, bladder, peritoneal cavity or colon. Occasionally a chronic form of the affection is observed. In these instances the premonitory or preliminary symptoms are absent, and the appearance of a tumor with or without retention leads the patient to seek medical aid. The prognosis of both the acute and chronic forms is not so unfavorable as previous writers have led the profession to suppose.—*Wien. Med. Wochenschrift*, 1892, Nos. 42-46.

GEORGE RYERSON FOWLER (Brooklyn).

## BONES.—JOINTS.—ORTHOPÆDIC.

**I. Rotatory Dislocation of the Patella.** By WM. ANDERSON, F. R. C. S. (London). Two cases are reported: 1. A boy, æt. fifteen, well grown and with good muscular development, slipped while walking, not striking the knee in falling, but on rising found it fixed in the extended position and very painful. The right knee was affected and the patella was found to be dislocated with its outer margin turned forward and the articular surface outwards, while the inner margin rested between the condyles. The outer border of the rectus was very tense and a tight ligamentous band extended from the projecting margin of the bone to the inner tuberosity of the tibia; the patella was quite fixed. Attempts at reduction under chloroform were at first unsuccessful, the quadriceps still remaining tense, but pushing the anæsthesia still farther, on flexing the joint about forty degrees and manipulating the patella, it was replaced with but little effort. The limb was placed in a back splint and, aside from some effusion into the joint, no other symptoms arose.

2. A stout, but somewhat unhealthy-looking woman, æt. twenty-three, while rising from the kneeling position on the floor, slipped and struck the outside of the left patella against the corner of an arm-chair. Pain in the knee and inability to flex the joint became evident. On examination the patella was found to be dislocated as in case 1, the tension of the rectus being marked, but without the tibio-patellar band. As before, efforts at replacement were unsuccessful, owing to the persistent rigidity of the rectus, but on pressing the anæsthetic farther the tension diminished, and during gentle manipulation while the knee was extended the bone snapped into place.

The author calls attention to the fact that it is possible to produce this dislocation on the cadaver only by dividing the ligamentous structures and actually twisting the bone into its abnormal position by means of a lever introduced behind it, from which he assumes that mechanical violence applied on the living subject can only act by provoking the muscular spasm which really effects and maintains the displacement. Wolf found reduction impossible after section of the

ligamentum patellae, and even after division of this and the tendon of the rectus, while Gaulke succeeded by the use of a carpenter's vise, and others by introducing a lever or a hook beneath the bone through an opening in the capsule. But the writer especially emphasizes the fact that under anæsthesia the rectus remains rigid after complete muscular relaxation has otherwise been obtained, and calls attention to the value of securing relaxation of that muscle by more complete anæsthesia, as a factor in obtaining reduction, before resorting to extreme operative measures.—*London Lancet*, Oct. 1, 1892.

JAMES E. PILCHER (U. S. Army).

**II. Implantation of Decalcified Bone after Senn's Method.** By DR. LE DENTU, Paris. Le D. reports the successful application of Senn's method in ten cases. The first case of his series occurred in a sixteen year old girl, the subject of tuberculosis of bone. A resection of 7 centimeters of the tibia and fibula was followed at once by its replacement by means of decalcified bone. Six weeks after operation commencing ossification of the bone was observed. Three months after the operation the patient was dismissed from the hospital with a simple retentive bandage, and three months later it was demonstrated that complete bony consolidation had occurred.

In the procedure as carried out by Le D. the bones are prepared somewhat differently from the method described by Senn. The femur and tibia of the ox are selected for the purpose. The pieces are first freed from periosteum and placed for eight days in a 16-100 solution of hydrochloric acid. They are then washed, placed for twenty-four hours in a sublimate solution, and finally preserved in a solution of iodoform in ether.

Implantation of bone is indicated in, 1st, extensive resection of bones for disease. 2d, in complete removal of long bones for tumor, or larger portions thereof in extensive comminuted fractures. 3d, in cases of extensive curetting for osteo-myelitis a tuberculosis, a considerable defect remaining. 4th, in trephining of the skull. 5th, in cases of operative treatment of pseudarthrosis.—*Gaz des hopitaux*, 1892, No. 40.

**III. Treatment of Deformity following Fractures of Bones healed in Deformity.** By PROF. HELFERICH (Griefswald.) Union of fractures with deformity is to be avoided by correct diagnosis, the shape and the localization of the separate fragments and the possibility of the interposition of a muscle are to be considered in this connection. Correct therapy is absolutely essential, the application of a plaster-of-paris bandage immediately after injury considered especially dangerous. A fracture uniting in deformity must be corrected as early as possible. Osteoclasis with Rizzoli's apparatus or osteotomy with subsequent extension by weight and pulley are measured to be employed. The efficiency of these measures by communicating shows a number of interesting histories.—*Münchener Med. Wochenschrift*, 1892, No. 12.

**IV. Ivory Dowels for direct Immobilization of Bony Fragments and as Support for the Periosteum.** By DR. J. GOUDARD (Aarau, Switzerland.) G's paper furnishes an interesting contribution upon the subject of the encapsuling of foreign bodies, particularly the transplantation of ivory dowels to replace bony defects. G. demonstrates how well aseptic foreign bodies are born by quoting a case where, after amputation of the thigh and profuse scraping out of the medulla, a rather large compress of gauze was left in the cavity of the bone, this was found and removed after a year had elapsed. Professor Biether, in whose clinic G. made his studies, performed this transplantation in thirty-five instances. In twenty-eight cases of recent complicated fractures he connected the bony fragment in the usual way by implanting an ivory dowel into the medullary canal: he was successful in twenty four cases. Seven additional implantations were performed in cases of pseudarthrosis the ivory cylinders being intended to support the periosteum. Among the thirty-five cases the final removal of the foreign body was required sixteen times: complete consolidation, however, being accomplished in every case. G. finally reports the details of an interesting though fruitless attempt to restore laryngeal cartilage which had been destroyed, the perichondrium, however, having been preserved.—*Pamphlet*, 1892.



**V. Study upon Luxations of the Interarticular Menisci of the Knee.** By DR. BRAQUEHAYE. Author collected from the literature of the subject sixteen observations of these very rare luxations and added one new case. On the basis of his studies he reaches the following conclusions: 1st, the luxation may be external or internal, corresponding to the luxated meniscus and anteriorly or posteriorly from the lateral ligaments. 2d, the luxation in an external and anterior direction is the most frequent; inward and posterior most rare. 3d, the luxation occurs only in cases of flexion of the knee, the limbs being separated. 4th, predisposing causes are (*a*) juvenile age, the joint surfaces of the menisci of children being not so smooth as adult, but having an anterior and posterior facet, and the condyles of the femur gliding over the latter, the intermediate discs fastened at the tibia or capsule moving anteriorly; (*b*) diseases of the joint as rheumatism, particularly hyarthrosis. 5th, the direct causes include all traumatisms that stretch or tear the lateral ligaments; further, certain movements in the joint producing relaxation of the ligaments, as for instance, rising from a stooping position.

The symptoms of the injury consist at first of an audible cracking accompanied by a violent pain. When the luxation is complete extension is impossible, and the patient is unable to place the foot on the ground. Usually he accomplishes reduction himself, but the same appearances recur, flexion and tension upon the extremity being repeated. At the side of the patella a small hard flattened body is clearly prominent. An effusion in the joint does not occur usually immediately after the accident, but more frequently later on. The symptoms of luxations backward are very similar to those anteriorly. If the prominence is not clearly felt the diagnosis may often be obscure.—*Journ de Med. de Bordeaux*, 1892, No. 30, p. 32.

GEORGE RYERSON FOWLER (Brooklyn).

**VI. Fibro-Plastic White Swelling, Tubercular Arthritis with Fibro-Plastic and Fatty Hyperplasia of the Synovial Membrane.** By DR. E. NICAISE, Paris. Dr. Nicaise reports four cases of disease of the knee-joint, tubercular in origin, but differing to such a degree from the ordinary cases of tubercular arthritis as to lead

to the possibility of an error in diagnosis. He says that in rare cases of tubercular joints, where the disease has continued with only a moderate intensity for a long time, there is a constant surplus of nutritive material and a new connective tissue forms between the fibres of the old connective tissue. This is hyperplasia, formation of fibro-plastic material. This disturbance of nutrition never directly produces any destruction of tissue, its continuance, on the contrary, produces new tissue. It can only take its point of origin from the tubercular nodule and it may give rise to a very considerable tumor. In the first case reported the synovial membrane measured from 3—4 cm. in thickness and the knee measured 41 cm. in circumference. The circumference of the knee in the second case was the same as the first, while the knee on the healthy side was only 31 cm.

The first impression in these cases is that they are peri-articular osteo-sarcomata, a sarcoma or a lipoma of the synovial membrane, but the recurrence of inflammatory attacks soon settles the diagnosis.

In the first case there were two abscesses, one communicating with the articulation the other developed over the tibia above the point where a sequestrum had formed, but it did not communicate with the bone. These abscesses were tubercular, with serous exudation and formation of fibro-fatty off-shoots which owed their formation to a particular disturbance of nutrition which has been found in the articular synovial membrane. The articular synovial membrane of the knee was transformed into a yellowish, fatty, fibro-plastic tissue of considerable thickness in front and laterally with vascularization of the skin and development of the subcutaneous veins, which might easily have been mistaken for sarcoma. From the side of the articular-cavity this fibro-fatty mass presented some yellowish off-shoots which filled up the articulation. Under the microscope this mass and the off-shoots were found to be composed of fibro-plastic tissue infiltrated with a great quantity of fat and enclosing arterioles which were affected by endarteritis and sometimes even obliterated. The surfaces of these off-shoots are covered by an amorphous bed, non-organized, which was thought to be composed of synovial concretions.

The evolution was slow without setting up acute inflammatory processes, and without the complication of suppuration from pyogenic

virus. There was no formation of the ordinary fungous tissue made up almost exclusively by embryonic elements nor of lardaceous tissue, but it was composed of a tissue of which the elements had a more complete organization, thanks to the slowness and slight intensity of the irritative process.

The inflammatory nutritive difficulty caused by the presence of tubercle produced this particular degeneration of the synovial membrane which resulted in a fibro-plastic tissue infiltrated with fat. Not only did it cause degeneration of the synovial membrane but the irritative process, far from causing destruction has caused on the contrary a hyperplasia, a sort of tumor. The progress of the disease shows that this degeneration of the synovial membrane is primary and that it was not preceded by a formation of fungous tissue, becoming lardaceous later and lastly becoming fibro-plastic and fatty.—*Revue de Chirurgie*, 10 October, 1892.

SAMUEL LLOYD, (New York.)

## GYNECOLOGICAL.

**I. Sarcoma of the Uterus.** Dy DR. TERILLON (Paris). The author gives a very valuable contribution to our knowledge of sarcoma of the uterus, based upon 14 personal observations. Two principal forms are distinguished, namely, sarcoma of the mucous membrane of the uterus and interstitial sarcoma. Both forms may be combined to a greater or less extent with each other, in each case the disease of either tissue exercising a marked influence upon the other and upon the enlargement of the organs and uterine cavity as well. Nevertheless, in most instances, the two forms are well characterized. The author describes two varieties of sarcoma of the mucous membrane, and likewise two varieties of the interstitial variety. The first variety of the mucous membrane group is characterized by knobby swellings, while the second is the ulcerative form (The polypoid variety is not mentioned, G. R. F.). The first of the interstitial types is characterized by considerable hypertrophy of the entire uterus, the whole thickness of its muscular structure being apparently attacked

simultaneously by malignant new formation growth. In the second type of the last named group, the growth is more circumscribed in its development in the muscular structure, proliferates toward the serous surface, crowds the latter forward, becomes more or less pedunculated with the base of the pedicle towards the mucous membrane of the uterine cavity. Finally, T. describes sarcoma with cystic degeneration.

Uterine sarcoma seems to attack, by preference women between the ages of 30 and 50, and particularly multipara. Only two of the 14 cases observed by T. had born each one child, while young. The growth of the neoplasm is usually very rapid. The general condition of the patient, however, is frequently but very slightly disturbed for a long time. The transformation of the fibromata into sarcomata is possible, according to T's. views ; he asserts that he has twice observed this to take place. It is but a rare occurrence, however.

The diagnosis presents some difficulties, particularly in the commencement of the disease. The principal points relative to the age of the patients, the occurrence of profuse metrorrhagia, considerable and rapid increase in the size of the uterus and enlargement of its cavity. Microscopical examination of removed portions should always be made when practicable.

The prognosis is exceedingly unfavorable. Recurrences are of frequent occurrence ; T. refers to one case recurring after two years.

As to treatment, in case an operation is still justifiable, vaginal extirpation of the uterus is preferable in cases of small tumor ; in case of larger growth, laparotomy with supra-vaginal extirpation, or as a more reliable procedure, as far as ultimate result is concerned, total extirpation.

Blaise (*Progrès med.*, 1891, No. 9), referring to T.'s paper calls attention to the occurrence of watery discharge in addition to metrorrhagia, as a diagnostic point. Again, as the sarcoma of the mucous membrane does not extend to the neck, he prefers the supra-vaginal amputation rather than the total extirpation recommended by T. The value of repeated curretting of the diseased mucous membrane in cases of sarcoma of this structure is likewise emphasized by B.—*Bull. et mem. de la soc. de Chirg. de Paris*, T. XVI, p 746.

**II. Recto-Vaginal Fistula.** By Drs. LE DENTU, FÉLIZET, QUÉNU (Paris). LE DENTU recommends the following procedure, as used successfully by himself. The left index finger being introduced into the rectum, he circumscribes the fistula upon the vaginal side by a semi-lunar incision having its convexity directed upwards. This incision begins and ends below the lowermost level of the fistula, and in its whole course is distant from the edges of the latter for some centimetres. A second incision, convex in the same direction unites the beginning and end of the former one, passing the fistula immediately adjacent to its lower edge. The semi-lunar shaped flap of mucous membrane thus marked out is excised. That portion of the recto-vaginal wall below the fistula is now detached for some centimetres, and, in order to avoid pocketing, a triangular-shaped flap of the rectal mucous membrane is resected, the anterior vaginal flap is drawn upwards beyond the fistula and is fastened here to the horseshoe-shaped freshened surface by means of sutures.

FÉLIZET operated by splitting the recto-vaginal wall by means of a cross-incision from the perineum, extending beyond the upper edge of the fistula. The posterior flap (the anterior rectal mucous membrane), is then split upwards to the fistula. The feces were then evacuated through the anus, or perineal wound. The vaginal wound, in this way, closed spontaneously without further interference. The perineal wound likewise closed spontaneously later on, by cicatrization.

QUÉNU employed a somewhat different, though not very dissimilar procedure. Like Félizet, he splits the recto-vaginal wall from the perineum by a cross-incision beyond the upper limit of the fistula. He then sutured both remaining fistulous openings each separately into the posterior vaginal and anterior rectal mucous membrane flaps with fine silk thread, and established drainage from the perineal wound by means of a drainage tube. In a case in which this method was employed the vaginal portion closed perfectly, but a recto-perineal fistula persisted. This finally healed, after thermo-cauterization.—*Bull. et mém. de la soc. de chirg. de Paris*, t. XVI., pp. 589, 595, 701.

GEORGE RYERSON FOWLER (Brooklyn.)

## REVIEWS OF BOOKS.

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TUBERCULOSIS OF BONES AND JOINTS. By N. SENN, M. D., PH. D.  
Philadelphia and London : The F. A. Davis Co., 1892.

In a volume of five hundred pages, dedicated to the Fellows of the American Surgical Association, Dr. Senn treats in his masterly style this subject which figures so importantly in pathology and practice. Recognizing the fact that a large part of the profession does not fully realize that most of the chronic affections of the bones and joints are of a tubercular nature ; and that the successful treatment of these diseases depends so much on an early diagnosis, and the timely application of constitutional and local treatment aimed against the tuberculosis, the author has compiled the most modern views upon the subject, and, with his own experiences, presented them to the profession in this neat volume.

The work opens with two chapters devoted to the history of the development of the knowledge concerning tubercular diseases of the bones and joints. From the earlier times, it comes down through the period when surgeons first began to realize that there was something of a connection between these diseases and pulmonary tuberculosis, until the anatomico-pathological basis of tubercle was established by Virchow, and the full consummation of the indisputable evidence offered by Koch as to the ætiology and nature of tubercular disease. The next chapter, finely illustrated with colored plates, is devoted to a biological study of the bacillus tuberculosis. Then follow chapters on the histology and histogenesis of tubercle. The view of Ziegler is adopted, that, tubercular inflammatory tissue originates from the fixed pre-existing connective tissue-cells, and not from leucocytes.

The pathology, diagnosis and treatment of abscess is set forth in a chapter on that subject. Iodoformization and curetting are the two methods upon which stress is laid. Following this are chapters on the general ætiology of bone tuberculosis, on the general symptoms

and diagnosis, on the prognosis and on the treatment. Tubercular arthritis is taken up in the same systematic way. The author does not go at once into the treatment of the local condition, but lays much stress on the general treatment; and prophylaxis receives a goodly share of attention. An important principle is presented in the opening sentence of the chapter on local treatment. "Although the existence of a tubercular bone or joint affection is only an indication of an older tubercular focus in some other part or organ, the clinical fact remains that the primary focus frequently remains in a latent condition, and that reinfection is more likely to take place from the bone or joint lesion."

An excellent chapter is the one devoted to the tuberculin treatment of Koch. After an analysis of the statistics, and a thorough consideration of the subject, pro and con, the author's unqualified views are expressed as follows: "I have given Koch's lymph a fair trial and have carefully observed its effects, and have become firmly convinced both of the danger which attends its use and its utter inutilty in curing any form of tuberculosis." This chapter, the author says, has been written for the special purpose of placing himself on record as one who protests earnestly against further experimentation with this mysterious and dangerous fluid.

Two chapters are given to the treatment of tuberculosis by parenchymatous and intra-articular injections. The administration of iodoform in this manner is strongly recommended. In connection with a case not benefitted by this treatment, and in which a resection of the joint was subsequently done, the author goes so far as to say that he regards intra-articular and parenchymatous injections of iodoform as the best preparatory treatment for the resection of tubercular joints in which this treatment does not meet the pathological indications. The warning against converting a simple tubercular inflammation into a mixed infection is emphasized.

The last thirteen chapters in the book are devoted to the study of tuberculosis of the special bones and joints. The operative technique in the resection of the various joints is fully considered.

This very excellent work, with its more than a hundred illustrations, offers no opportunity for adverse criticism. It embodies not

alone the views and observations of Senn, but presents in a condensed form the modern ideas from the most recent literature on the tuberculosis of the bones and joints. Its richness with references to the literature on the subject makes it a valuable book of reference as well as a hand-book for every-day practice. The fact that the author is not only a surgeon but a pathologist as well, is amply evidenced in its every chapter. Productions of this sort are the instruments which are winning for the American scientific literature the standing which ere-long it is destined to attain. It is for the American profession to congratulate and thank the author for having produced a work of such scientific value.

JAMES P. WARBASSE.

**DIE MIKROÖRGANISMEN DER MUNDHÖHLE.** Die örtlichen und allgemeinen Erkrankungen welche durch dieselben hervorgerufen werden von W. D. MILLER, Dr. Med. et Phil., Professor am Zahnärztlichen Institute der Universität, Berlin. Mit 134 Abbildungen im Texte, und 18 Photogrammen. Zweite Auflage. 8vo, pp 448. Leipzig: Verlag von Georg Thieme, 1892.

"The micro-organisms of the oral cavity" is the title of one of the most recent German publications. The book is a systematic compilation of the essentials of numerous published monographs, as well as the results of the author's many original investigations.

The first chapters are general in their scope, and give a synopsis of the methods of bacterial investigation. The form, the mode of propagation, the way in which by their own activity they are self-destructive, and the influence of bacteria upon living, as well as upon lifeless material, are all the subjects of interesting paragraphs. The history of the discovery of ptomaines, and the distinction between ptomaines, toxalbumines and leucomaines form a valuable section of this portion of the book.

With these general discussions as a basis the author confines his attention in the balance of the work to the bacteria found in the mouth, and growing in the nutrient media furnished by the saliva, mucus, desquamated epithelial cells, teeth, and the remnants of food.



Several chapters are devoted to the important subject of dental caries. The various theories which have been formulated as to the causes of this pathological condition, such as the one held by some that worms living in the gums produce the disease, or the equally amusing theory of the powerful electric currents existing between the crown and roots of each tooth, together with many others, form an entertaining chapter. Dr. Miller's personal views are best given by the following quotation: "Our knowledge of the micro-organisms which are concerned in caries of the teeth is even yet incomplete. The important fact has been determined, however, that all micro-organisms of the oral cavity which possess the ability to cause an acid fermentation from remnants of food can take part in the first stage of dental caries; further that all micro-organisms possessing a peptonizing or digestive action upon albuminous material can take part in the second stage (*i. e.* the dissolution of the substance of the teeth), and that finally all those which possess both characteristics are active at the same time in both stages." The personal investigations of the author which have led him to support this belief have been extensive and thorough. Full details of them are given. The technique of this rather difficult field of microscopical study is fully and clearly described, and these sections are of special value to a student. Among other examples cited is the fact that bakers are so subject to caries as to cause this especial form to be called "Baker's caries." Also the results of an examination of numerous skulls which show that those races which subsist upon meats chiefly (*e. q.* Eskimos) are practically free from caries (only two per cent.) while vegetarian races (*e. q.* Chinese) are extraordinarily affected (forty per cent.)

Prophylaxis and the use of antiseptic tooth washes are carefully considered, as well as the relative value of sterilization methods as applied to surgical instruments.

The second section is devoted to the pathogenic bacteria which have been found to exist in the mouth. Each in turn is made the subject of a description embodying all the facts known at the present day of its life history. Following these is a chapter devoted to the various diseases of the lungs, intestinal tract, etc., caused by these

various mouth bacteria. The value of this entire section is enhanced by the illustrations which are numerous and good.

The book is a valuable accession to any medical library ; for the bacteriologist the latest methods of investigation and of technique are described ; for the surgeon the means of sterilization and the experiments as to the relative value of antiseptics, are of value ; especially for the dentist the comprehensive discussion of caries renders it worthy of careful attention.

H. P. DE FOREST.

TEXT-BOOK OF NERVOUS DISEASES. By C. L. DANA, A. M., M. D., pp. 524. New York: WM. WOOD & CO., 1892.

A highly creditable and pleasantly elaborate treatise. There will be always a demand for such thorough treatises as this of Dana.

The general plan of the book would, however, we hold, be more acceptable if, in the presence of Edinger's and of Herter's new work, normal neurology, anatomical and physiological, were elided and the whole space utilized for the main purpose. But necessarily it is a compilation, and as such there may well be differences of opinion as to plan and even to authorities.

Dr. D.'s zeal is so well known, his standing as a neurologist is so secure, and his reputation in any case will be so far enhanced by a work of such general excellence as that under notice, that gentle criticism will be a greater honor than exuberant adulation.

There are many casual matters that might receive mention if space permitted.

Evidently he is somewhat enamored of athetosis, from the presence of two illustrations (pp. 19 and 366), the more so as this is only a special manifestation of hemiplegic chorea ;—justifiable perhaps as a personal compliment to Hammond.

For an exact estimate of the trustworthiness of a work, a reviewer naturally turns to fields with which he is most familiar or that have particularly interested him.

To bulbar paralysis D. gives two pages, but dismisses the equally frequent pseudo-bulbar with a line, attributing it to "chronic lesions of the cerebral hemispheres," and mentions certain signs as "always

sufficient for a diagnosis." In reality however the differential diagnosis between these two is recognized as often most difficult. And the pseudo form may be due to trouble in the basal ganglia, to peripheral neuritis, or to no discernible cause, as well as to cortical lesions. The bulbar type of syringomyelia is mentioned on p. 285.

Under syphilis of the nervous system he almost if not quite ignores one distinct and sometimes important form, that due to the syphilitic poisoning *per se* independent of gross pathological changes; this may cause intense cephalalgia, stuporous conditions, temporary impairment of the pulpillary reaction, etc.

Open to question is the statement on p. 70 that the most common infection in this country to cause polyneuritis is diphtheria; syphilis and malaria must be as frequent causes.

In describing the brain-circulation he has unfortunately reiterated certain of the errors in his article in the *Med. Recd.* for Jan. 12, 1889. This perhaps merely illustrates the tendency of all men who whilst they may have worked well on some lines, try to round out at other points by hasty recapitulation, (p. 315). "Consequently a knife plunged straight into the brain does not cut many vessels." If the brain-surface were level instead of rolling, this might be a proper inference; but in reality such exemption can only occur when the flat of the blade enters either perpendicularly to the surface of the convolution, or just at a bottom of a fissure,—very limiting conditions. "The most of these vessels enter the posterior portion of the sinus" (longitudinal). It is true that the largest supra-cerebral veins discharge a little posterior to the middle point of this sinus, but the posterior portion for some distance is free from entering veins.

(p. 316). "The superficial cerebral veins are *venæ comites*." They are certainly not. Only the dural veins are such.

"Most of the blood of the convexity and mesial surface must pass into the longitudinal sinus." As to the convex surface the statement is far too sweeping as any one can see by examining the plates and description of Labbé (*Arch. de Physlg.*, 1879). The blood from the external occipital region goes largely to the lateral sinus, and that of the Sylvian to a less extent basalwards. "The superior longitudinal sinus also communicates slightly \* \* \* with the facial vein."

This must refer to the path by the foramen cœcum,—which is, however, with rare exceptions, closed long before adult life. “On the whole, however, the system of the convexity and mesial cerebral surface is a close corporation, the blood having to pass into the superior longitudinal sinus and torcular.” Nor is this true, as abundant and ample anastomoses exist between all these and neighboring veins. Here “it (*i. e.* the blood from the long sinus) meets that of the straight and occipital sinuses, and flows forward through the lateral sinuses.” It *may* do so but in a majority of cases the two currents intermix slightly or not at all, as was shown by Rüdinger, and in this country by Dwight (“Anatomy of Head,” 1876), one stream turning into one lateral sinus and the other to the opposite lateral.

(p. 317). “It is safe to tie any of the sinuses except the lateral and the posterior part of the longitudinal.” Either of these sinuses may be tied at any point in their course, with but the slightest chance of harm resulting;—safe within the ordinary surgical acceptance of that term, as many pathological cases testify and every surgeon knows. But there would be serious risk in tying the straight sinus—an entirely possible operation.

(p. 317). “The pressure \* \* \* in the cerebral sinuses is 70 to 80 mm. (Gerhardt).” He might also in the same sense have quoted directly from Mosso. Yet in point of fact no one knows what the normal pressure in the sinuses is. It certainly cannot be greater than in the cerebral veins, for if so the blood would flow from the sinuses into the veins instead of the reverse. It has been fairly demonstrated (Bergmann) that no such pressure (70 to 80 mm.) rules in the cerebral veins. The trouble with the experiments on the sinus-pressures lies in the peculiar conditions and the assumption that the accumulated pressure back of an obstruction represents the normal lateral pressure.

(p. 317.) “The diameter of the common carotids is 6.7 mm. (Thorne), that of the subclavians 6.2 mm., that of the internal carotids 4 mm., and that of the vertebrals 3.5 mm. (Gerhardt). The blood to the brain, therefore, has passages three-fifths as great as the total arterial area near the heart.” By following his own plan of reasoning as well as possible, we find here a note-

worthy error. The areas of circles are proportional to the squares of their diameters. Hence  $(6.7)^2 + (6.2)^2 = 44.89 + 38.44 = 83.33$  for the common carotid and subclavian. Again  $(4.0)^2 + (3.5)^2 = 16.0 + 12.25 = 28.25$  for the internal carotid and vertebral. This gives as the ratio  $\frac{28.25}{83.33}$  or almost exactly one-third instead of three-fifths as stated in the quotation (and which he evidently obtained by simple addition of diameters  $\frac{(4.0+3.5)}{(6.7+6.2)} = \frac{7.5}{12.9}$ ). Besides this he ignores entirely the aorta beyond the subclavians. Hence his estimate is doubly and enormously in error.

Perhaps the statements here called in question are of little importance anyhow,—but if worth making at all, would it not be better to have them nearer the fact?

The type is clear though rather small, the figures (210 in number) are well executed, the whole work compendious. It is without doubt one of the books that will sell well, and will prove very useful. The index does not do full justice to the contents of the volume.

WILLIAM BROWNING.

#### DISEASES OF THE KIDNEYS AND BLADDER. A Text-book for Students.

By W. F. McNUTT, M. D., M. R. C. S., Ed., J. R. C. P., Ed., Professor of the Principles and Practice of Medicine, University of California, etc. Pages 1-242. Eighteen illustrations. Octavo. Philadelphia: J. B. Lippincott & Co., 1892.

This volume is based upon notes of lectures, some of which have been revised and elaborated by the author, delivered to the medical students of the University of California. It is divided into five sections: Section I, twenty-three pages, reviews the anatomy and physiology of the kidneys, and includes a description of their anomalies of form, number and position. Section II, one hundred and one pages, is devoted to diseases of the kidneys. Section III, thirty-six pages, embraces diseases of the pelvis (of kidney). Section IV, forty-two pages, is occupied with the discussion of diseases of the bladder. Section V, twenty-one pages, is given up to the consideration of diabetes—mellitus and insipidus.

These subjects are considered from the standpoint of the physician, as distinguished from the surgeon, though there is a chapter upon the "Surgery of the Kidneys," in which the indications and directions in detail are given for the performance of aspiration, nephorrhaphy, nephrotomy, nephro-lithotomy and nephrectomy; the treatment of diseases of the bladder that call for operative interference, however, is dismissed with the simple statement of the fact.

The author is a medical professor, and the book is made up of lectures delivered to medical students, to whom exclusively it is addressed. Apart from its intrinsic qualities, therefore, it has an interest for the profession as exemplifying the instruction afforded by the didactic lectures which occupy so much of the student's time during the school year. The average student attends these lectures religiously, and takes notes industriously; indeed, in some cases, the note-book is all the text-book he has. Necessarily fragmentary and incomplete, it is relied upon, nevertheless, to supply the information that will enable him to pass his examination. The notes upon which the text-book under consideration is founded are infinitely better than the student can take for himself, and they have been revised and elaborated to some extent by the author, but they exhibit the fault, apparently inseparable from the method, of teaching the practice of the individual as the practice of medicine, or, at least, of giving it undue prominence. While it is perhaps inherently impossible to teach this subject (Practice) with the precision that belongs to purely scientific instruction, it is probable that there is little if any essential difference in the methods employed in actual practice by men of equal ability and accomplishment, and the nearer medicine approaches to a science, the greater the uniformity in this respect will be—a consummation devoutly to be wished—and to which the text-book should contribute by pointing out the indications and the different ways in which they may be met; instructing the student also that the choice between methods equally scientific must be determined by the circumstances in each case. The text-book, therefore, should be impersonal. It is not a proper vehicle for the expression of individual views, whether of theory or of practice, however valuable in themselves they may be. The propriety of addressing a book of

this sort to students, as forming a separate and distinct class of readers, is questionable. Undoubtedly in what may be called the fundamental sciences—fundamental as related to the study of medicine—there is place for a “student’s series,” but a work upon practice that is not adapted to the needs of the practitioner is not suitable for the student, the student of to-day being the practitioner of to-morrow. Indeed, in this department of medical literature, the abridged edition, that which touches only upon salient points, or what the author regards as such, serves a more useful purpose in the hands of the practitioner, who is able to note and supply omissions out of the knowledge that comes of wider reading and from experience, than in those of the student who knows only what his book tells him. “An Elementary Practice of Medicine” would be preposterous.

These general remarks have been suggested rather by the manner than by the matter of Dr. McNutt’s volume. The author has succeeded in his endeavor to present the subjects of which it treats at once clearly and concisely; moreover, it may be said that he is a safe guide to follow—for those who prefer to trust rather to the beaten path than to a knowledge of the country—though it affords them wider range and broader views.

Endeavor is made to avoid the confusion that arises in the mind of the student by reason of the clumsy nomenclature of diseases of the kidneys by the use of terms that at once suggest the part of the organs chiefly, or primarily, involved; for practical purposes they are regarded as consisting, anatomically, of (1) Uriniferous tubules; (2) intertubular (interstitial) tissue; (3) blood-vessels with thin Malpighian tufts, and the inflammatory diseases to which they are subject are named accordingly—*Tubular Nephritis*, (*a*) acute, (*b*) subacute, (*c*) chronic; *Intertubular Nephritis*; *Degenerations* (amyloid, etc.)—which always begin in the blood-vessels,—and *Nephritis* in which all the tissues are affected. Each disease is considered with reference to its etiology, pathology, symptoms, and treatment. Under the last head, the author’s own methods are described especially and with considerable detail, being illustrated in many instances by the prescriptions that he is in the habit of employing.

A chapter is devoted to the urine; its chemical composition and urinary sediments. One might naturally expect to find directions for making chemical and microscopical examination of this product, but only two tests—both for albumen—are mentioned, the reader being referred to special works on Urinary Analysis for further information upon the subject. It is to be regretted that greater prominence has not been given to the consideration of “Nephritis without Albuminuria.” Such cases are by no means infrequent; indeed, it is believed that they would become common if generally recognized. On the other hand, the necessity of making repeated examinations of the urine before deciding as to the existence of chronic albuminurea is not sufficiently insisted upon.

The points in the differential diagnosis of the affections included under the term “Bright’s Disease” are clearly set forth, and the treatment appropriate to each as clearly defined. The author believes in *treating* Bright’s Disease, and his book is calculated to inspire the same belief in others. The results of treatment in his hands have been such as to fully justify his faith in the efficacy of remedial measures, warranting the assertion that “more than fifty per cent. of such cases (tubular nephritis) end in recovery.” It would be better for patients if the profession generally shared his views in this direction. The physician who would rather be mistaken in his treatment than in his prognosis need tell his patients only that they have “Bright’s Disease”—they will make a prognosis for themselves: it certainly is not enough to warn them against drinking beer and getting their feet wet, reserving positive treatment for the complications—which are pretty sure to arise under such management. Among the drugs in which the author expresses especial confidence are arsenic, mercury, iron and sulphur. Commenting upon the value of a mixture containing arsenic, iron, and mercury, he remarks that “the addition of arsenic and mercury (bi-chloride) prevents the decomposition of food in the alimentary canal, and the offensive odor of the evacuations.” It is not presumed that this is the only influence attributed to the action of these agents, though such is the inference that the student is likely to draw from the text. The use of the carbonate of iron among other ferruginous preparations, in combination with other



agents, is advised, but the reader is left in doubt whether the saccharated carbonate, or Vallet's mass, is meant; one prescription given calls for half-an-ounce ferri carbonate to a four-ounce mixture, (seven and a half grains at a dose), another divides one drachm of it into thirty capsules (two grains at a dose). In the following formula a typographical error is manifest :

R—Potassii Acetatis, . . . . .	ʒvj—ʒviij.
Spts. Cætheris Nitrosi, . . . . .	ʒiv.
Tinct. Hyosyami, . . . . .	ʒi.
Syr. Codii, <sup>1</sup> . . . . .	ʒi.
Aquæ Chloroformi, . . . . .	ad. ʒi.

M. sig. ʒi every two hours.

In this formula, it is impossible to say whether "*ad.*" appears by mistake for "*aa.*," or whether there is a misprint of the quantity of chloroform water desired.

Frequent and enthusiastic reference is made to the mineral springs of California, which are found in great number and variety.

As has been said, diseases of the bladder are considered in their *medical* aspects only and with reference to their management by the "family physician." Some of them are hardly more than mentioned: for example, only a page is given to "Stone in the Bladder," which, of course, is regarded as a surgical disease altogether, and, therefore, without the province of this volume. The physician, however, should be competent to "sound" the bladder, and one might reasonably expect to find the necessary instructions in a work of this kind; where else, indeed, shall the student look for them? The same remark may be made as to directions for washing out the bladder. The danger in certain conditions of suddenly emptying a distended bladder is not adverted to. In view of its character, and of the purpose the book is designed to serve, the assumption of a knowledge of ways and means on the part of the reader is wholly gratuitous. Naturally within the limitations indicated, cystitis receives the largest share of attention. Excellent rules are laid down for what may be termed the systemic treatment of the disease, but local measures are not given the prominence to which their importance entitles them.

<sup>1</sup> (Another typographical error—the genitive ends in *æ*.)

No mention is made of operations for securing thorough drainage of the bladder in cases of obstinate cystitis in the male.

Although, for convenience sake, diabetes is often grouped with diseases of the urinary organs in medical treatises, it does not properly belong among them; if it were desirable to make it the subject of a section in this book, its title should have been supplemented accordingly.

A special word of commendation should be given the publishers. The book is well bound, and the clear and legible type, the heavy paper, the wide-margined pages—these are attractive features that will not fail of due appreciation.

D. R. BROWN.

REPORT OF A CASE OF TUMOR OF THE LEFT  
FRONTAL LOBE OF THE CEREBRUM;  
OPERATION; RECOVERY.

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NEUROLOGICAL REPORT BY DR. BOOTH.

EVERY case presenting the symptoms of a cerebral neoplasm generally throws some light upon the diagnosis of intracranial disease, and is of undoubted value either in support of the findings in similar cases, or standing alone is of great importance to contradict or correct former localizing and pathological factors. The case which I am about to report may be placed in the first group, and is in support of former views concerning the functions of the fore-brain, and therefore only as additional evidence is it of importance.

The patient was referred to me on September 14, 1892, by Dr. David Webster, and the following history obtained:

Edward M., aged twenty-four years. Has had hip-joint trouble since a child; aside from this has enjoyed fair health until eighteen months ago, when he commenced to have epileptic attacks, which the brother of the patient describes as follows: "He falls down suddenly, becomes unconscious, and then ensue general convulsive movements of both upper and lower extremities." There is no

history of any attack of hemi-spasm, or any limited to a single muscle or group of muscles, though the brother thinks that the jerking was more marked in the right arm. The last attack was in June, and in this one he fell, striking chin and left side of head quite severely. Shortly after this his relatives noticed for the first time the swelling on left temple, the patient himself stating that it was there before this fall. About the same time (June) failure of vision became a marked symptom, and now he can distinguish objects only when held very near. The patient was also troubled by a turning-in of the left eye. No history of hemi-anopsia. During the last month he has had what he designates as fainting spells, in which there are no convulsive movements. One of these seizures occurred during this examination. While sitting in a chair he suddenly remarked, "I feel bad," and put his hand to his head. No convulsive movements of any kind took place, his face became pale, and he seemed in a kind of stupor. Pulse was 86 and of fair strength. He could be partially aroused by shaking, and in reply to questions as to his sensations, etc., feebly replied: "I feel all gone." Duration of this attack was about three minutes. He seemed stupid and uncertain as to his statements during the rest of the examination. For the past year he has had a good deal of headache of a severe character, chiefly in the forehead, through temples, and often radiating back as far as the occiput. Has never vomited. Memory has failed very much during the past year, at present having difficulty in recalling recent events and the names of those with whom he is well acquainted. According to the brother of the patient, there has been a very marked change in his manner; he is more dull and less inclined to talk.

There is no history of injury to the head, other than the one received by falling in the attack of June last.

Confesses to two attacks of gonorrhœa, but denies syphilis.

Parents both living and healthy; there is no history of phthisis in the family.

*Examination.*—Manner quiet: face rather expressionless; speech slow and somewhat uncertain, though there is no marked aphasia; tongue straight and clean; no decided paresis of face, but there is evidently less expression on right side as compared with the left. There is a paresis of the right external rectus. Pupils widely dilated; no reaction to light or accommodation. Vision very much reduced in both eyes, the left being the weaker. There is marked optic

neuritis of both nerves, with numerous small hemorrhages. Stands fairly well with eyes closed; no ataxia; knee jerks absent even with reinforcement. Grasp of hands, as indicated by dynamometer, right, 35-35; left, 35-35. Heart and lungs normal. No anaesthesia or analgesia. Sense of taste normal. Sense of smell is very deficient on left side, there being no reaction to tests made with asafetida, oil of cloves, chloral and iodoform. On the left temple, just back of external angular process of frontal bone, is quite a prominent swelling, oval in shape, quite tender, pressure on which causes pain to radiate through the head as far back as the occiput. In making deep pressure at base of tumor, the finger passes into a depression indicating absence of bone at this point.

The main points, then, in the case, briefly considered, are: A history of chronic hip-joint trouble; general health fair up to the past year, when there developed the following symptoms, viz.: headache, chiefly frontal, at times very severe; change in character; tendency to lethargy and depression; loss of memory; epileptic attacks; diminution of the sense of smell; failure of vision; an advanced optic neuritis; finally, appearance of swelling in left temple.

These symptoms were certainly sufficient to warrant the diagnosis of an intracranial tumor, and its location in the anterior fossa, or, more definitely, in the left frontal lobe. With this diagnosis the patient was referred to Dr. B. F. Curtis for opinion and propriety of a surgical operation.

Dr. Curtis agreed with me in the diagnosis, and suggested that the localized absorption of bone was an indication of a superficial tumor of the brain, which he thought could be removed by operation.

The patient was admitted on September 24 to St. Luke's Hospital, where he was also examined by Dr. Dana, who concurred in the above opinion.

*Remarks.*—Although this case presented no difficulties in diagnosis, and the lesion being situated in the fore-brain, a locality in which localizing symptoms are not always present, still it may be of some interest to briefly consider the main symptoms upon which the diagnosis was based, viz.: 1, unilateral anosmia; 2, optic neuritis; 3, aphasia; 4, mental change; and 5, external swelling on temple.

I.—The loss of the sense of smell on the left side was quite

marked, as was demonstrated by careful testing. Both nostrils were alternately plugged with absorbent cotton and the following substances used: iodoform, asafoetida, oil of cloves, chloral and ammonia, from the last of which there was a slight reaction on the left side. On the right side there was response to asafoetida and iodoform, but not to oil of cloves. The tumor penetrated to quite a depth, invading the left olfactory tract and causing paralysis of this nerve.

II.—Ophthalmoscopic examination showed the condition of double-choked disc to a marked degree, the margins of both discs were wholly lost, and no line of demarcation could be made out between the nerves and retina. This factor, being a general and not a localizing one, is here quoted only as an important symptom in support of the diagnosis of tumor.

The intense degree of neuritis present was caused by the indirect effects of the tumor through pressure. There was a decided paralysis of the right external rectus, which I am not able to explain as due to the lesion found. I am inclined to believe that there may be another tubercular deposit involving this branch of the third nerve.

III. Aphasia.—Through clinical experience, and the writings of Ferrier, Seguin, Starr and others, it is generally agreed that lesions of the frontal lobe produce no specific symptoms unless they extend as far caudal as the base of the second or third frontal gyri. The tumor involved the first, second and a greater part of the third frontal convolutions, and the patient gave evidence of amnesic aphasia.

From a consideration of the position and size of the growth, as well as its deep penetration, I would have expected a greater disturbance of speech, but beyond an occasional inability to recall a word he wished to use he had no other aphasic symptoms, evidently demonstrating that the growth had not involved to any great extent the caudal extremity of the third convolution.

IV. Mental Change.—Lesions of the pre-frontal region have in a large percentage of reported cases shown distinct manifestations, chiefly psychological, namely, mental slowness and uncertainty.

impairment of memory, change of character, etc. During the past year his memory had failed very much; he had difficulty in recalling recent events, and even the names of those with whom he was well acquainted were forgotten. He became dull and apathetic and was not inclined to converse; would sit quiet without taking any interest in the affairs of the household. This condition was contrary to his former self, and was definitely explained by the lesion found at the operation.

V.—The diagnosis had already been made when the slight oval lump was noticed on left temple. At first I was in doubt whether this was foreign to the intra-cranial trouble or part of the same. Examination by finger and exploratory puncture, revealing absence of bone at this point, left no room for doubt but that we had a tumor of the brain causing absorption of bone either by pressure or disease.

Perforating tumors of the cerebrum are not common, in spite of the mass of literature on the subject of brain tumor and the number of cases reported. As an example of a tumor in the location of the present one, and in which the growth was successfully located and removed, I may briefly refer to a case reported by Dr. F. Durante, of Rome, Italy.

The patient, aged thirty-five years, was first seen in May, 1884. Three months before her left eyeball had begun to be displaced downward and outward. For a year or more the sense of smell had been lost. Memory had become impaired, particularly in regard to remembering names, and she experienced a peculiar sensation of vacuity about the head, which caused her to feel uncertain in her movements. There had been a change in disposition. Dr. Durante diagnosticated a tumor of the anterior lobe of the brain. The skull was opened above the orbit, and a tumor weighing two and one-half ounces was enucleated. It occupied the anterior fossa at the base of the left cranium, extending to the right and upon the cribriform lamina, which it destroyed. Posteriorly it extended to the glenoid tubercles before the sella turcica. The patient made a rapid recovery, and was living and well three and a half years later.

## SURGICAL REPORT BY DR. CURTIS.

Edward M. was admitted to St. Luke's Hospital September 24, 1892. On examination, a tumor one and one-half inches in diameter, projecting about one-half of an inch above the surrounding level, is to be seen in the left temporal region, just above the zygoma. This tumor is spherical, tense and smooth on its surface, and a bony edge can be felt around the upper half of its base, as if it projected from within the skull. The skin is normal, but pressure is slightly painful over the tumor and in its immediate neighborhood. At two examinations made just after the patient had been walking about, a distinct



FIG. 1.—External projection of cerebral tumor. *A*, tumor.

although slight cerebral pulsation was felt in the tumor, but at all other times this was absent. An aspirating needle inserted into the center of the tumor encounters no bony resistance, and can be passed to a depth of two inches. The needle appears to penetrate through soft tissue, and then at a depth of about an inch through a dense membrane into soft tissue again. Two attempts at aspiration were negative, but one of them was followed by the oozing of a drop of whitish fluid, resembling pus, from the needle puncture.

Dr. Charles S. Bill kindly examined the eyes and reported as follows: Convergence of the right eye. Exophthalmos downward



and outward of the left eye, with distinct elasticity backward. Double optic neuritis with numerous venous hemorrhages to the third degree, most marked in the right eye. Total blindness is imminent.

The right hip joint is partially ankylosed in moderate flexion and adduction, with a practical shortening of five and one-half inches, and a real shortening of three and one-half inches, of which one and one-half inches lies between the great trochanter and the knee joint—arrest of development. The scars of several old sinuses are to be seen near the crest of the ilium and the trochanter, and on the anterior and internal surfaces of the thigh, two of which have only recently closed. Examination of the heart, lungs and abdomen was negative.

*Operation.*—September 29, 1892. The head and left eyebrow had been shaven and prepared for operation in the usual manner. Ether anæsthesia was employed, preceded by a hypodermic injection of morphine sulph., gr. 1-4; atropine sulph., gr. 1-100. Dr. Curtis operated, assisted by Dr. Francis H. Markoe.

A horse-shoe shaped incision was made, its apex directed upward and reaching to within about one inch of the median line, its anterior limb ending in the middle of the left eyebrow, and its posterior limb ending in front of the ear, just above the zygoma. The knife was carried directly down to the bone and the pericranium dissected up with the flap by an elevator. While somewhat adherent to the surface of the tumor, the pericranium could be separated from it by blunt dissection, and the flap was turned down until the entire external tumor was exposed. The tumor was elastic and fluctuating, and was covered with a soft, thick, red membrane, which was accidentally punctured in a couple of places, giving issue to a cheesy fluid resembling the contents of a tubercular abscess, or broken-down gumma. This membrane was cut away and a circular opening in the bone, about one inch in diameter, was disclosed, the bone being thickened on its outer surface around the rim. The opening in the bone was occupied by a more solid broken-down material, yellowish in color, and of the consistency of cream cheese, and this was removed by the curette down to a firm elastic surface about on the level with the dura mater, which it proved to be. Below this the hard tumor tissue could be felt. With rongeur, chisel and gonge the opening in the bone was enlarged nearly equally in all directions until the upper margin of the tumor could be felt. The bone was very thick and sclerosed above, requiring very forcible blows upon the chisel for its removal, but the pulse was not perceptibly affected by the shock of these blows. The lower limits

of the tumor could not be reached because the zygoma prevented any further retraction of the flap, so the two ends of the process were divided by the chisel, being exposed by carrying the posterior limb of the incision a little further down, and by making a small incision anteriorly. The flap could now be forced much farther down, after it had been detached from the supra-orbital ridge, and the inferior margin of the opening in the bone was cut away until the floor of the anterior fossa of the skull (the roof of the orbit) was reached. The anterior branch of the middle meningeal artery was divided and after a little trouble was secured. The opening in the skull was quadrangular in shape, and measured two and one-quarter inches from before backward, and two and one-half inches from above downward. Its limits were: anteriorly, the external angular process; inferiorly, the floor of the anterior fossa; superiorly, a line parallel with, and one and one-half inches distant from the median line; and posteriorly, the root of the zygoma.

The finger was carried inward along the roof of the orbit, detaching the dura, and it was found that the tumor had also caused absorption of the bone at this point, but the dura was readily separated from the edges of this bony opening, which was circular and about three-quarters of an inch in diameter, and there seemed to be no involvement of the contents of the orbit. The finger could also detect the posterior limits of the tumor below, nearly corresponding with the fissure of Sylvius, and the exploration was carried toward the median line until the rounded border of the lesser wing of the sphenoid bone was felt and followed nearly or quite to the anterior clinoid process. Up to this time the dura had not been opened, and the operation had thus been practically limited to an exploration, but as it appeared that the limits of the tumor were now within reach on all sides, removal of the mass was decided upon.

After the ligation of two or three large veins in the dura by ligatures passed under them with a curved needle, that membrane was opened by a curved incision carried around the upper limits of the tumor, about one-quarter of an inch away from the point of adhesion between tumor and dura. The brain was exposed and appeared healthy, but the tumor could be felt just below its surface, and after ligation of one vessel (also with the curved needle) the incision was carried down through the brain in the same line with the scalpel. The surface of the tumor was reached at a depth of about a quarter of an inch, and was found to be limited on its cerebral aspect by a very firm,



*T - Tumor*  
*N - Nodule*  
*S - Separate Mass*

TUMOR OF THE CEREBRUM.



smooth capsule. The end of the index finger was then inserted and the tumor readily separated from the cerebral substance without any hemorrhage of moment, some small, almost detached, nodules being recognized by the finger and shelled out with the main mass. When the finger had penetrated to the floor of the anterior fossa, a blunt instrument passed in below the tumor, outside of the dura, was distinctly felt, and it was proven in this way that all connection between the brain and the tumor had been separated—the latter being only held in place by the dura. The latter was then cut away by carrying the former incision downward, partly by the scissors, partly by tearing with the end of the finger, and the tumor was removed, a couple of vessels being clamped and ligated afterward. Digital exploration of the cavity revealed a small nodule in the substance of the brain, just beyond its posterior limits, and this nodule was easily shelled out.



FIG. 2.

The cavity in the skull had almost entirely filled up with the expanding brain tissue, but a considerable quantity of iodoform gauze was packed in such a way as to allow of its easy removal by traction through the posterior part of the wound. The flap was then returned to its place and secured by fine silk sutures on the forehead, and coarser catgut on the scalp, the upper portion of the posterior limb of the incision being left open, and its edges separated by a few layers of gauze. The extension of the posterior incision in front of the ear, and the small wound of the cheek which had been made for division of the zygoma, were sutured. A thick sterilized dressing was then applied, with considerable pressure.

The mass removed was about the size of a small hen's egg, ovate in shape, but markedly lobulated, measuring about two and one-half inches in its long diameter, and about one and one-half inches in its short diameter. It was covered externally and below with the adherent dura excised with it, and on all other sides by a firm fibrous capsule. The main mass consisted of two almost globular lobes fused together, the lower having caused absorption of the roof of the orbit, and the upper having been the base of the external tumor at the opening in the vault of the skull, both presenting at these points circular roughened spots on their surface. Three or four small lobes were attached more or less firmly to the main mass, and one was entirely distinct, having been separated by normally soft brain substance. After hardening in alcohol and the removal of a thin slice from the centre for examination, the tumor weighed 20.25 grammes.

Dr. John S. Thacher, pathologist to the hospital, reported: "The tissue is quite firm, and on section is yellowish, except the superficial layer, which is gray and forms a capsule to the mass. On microscopical examination all but the superficial layer is found to resemble cheesy degeneration. At the surface is inflamed connective tissue containing a few giant cells and some small areas resembling tubercle tissue. By appropriate staining tubercle bacilli are found."

There was no shock after the operation, and no stimulation was required. Consciousness was rapidly recovered, and the patient spoke intelligently on awaking. The following morning the patient could help himself to a drink from a cup standing near the bed, and



FIG. 3.—The tumor, natural size.

complained of nothing except a sensation of something being in the left eye, probably due to oedema and eversion of the conjunctiva. He slept most of the day. He talks as well as before the operation. On the fourth day the bowels moved. On the fifth there was a marked oedema of the right eyelid, and when the lid was raised the patient said that he could see nothing. On the sixth day the dressing was changed, but the packing under the flap was left untouched. The sutures were removed from that part of the incision which crossed the forehead, and union here was complete.

On the seventh day the eyes were examined by Dr. Bull, who reported very large hemorrhages occupying the entire right retina and two thirds of the left, with no perception of light. The case pro-

gressed without event until the seventeenth day, when he was suddenly found to have recovered sight in the left eye, recognizing some visitors at the foot of his bed.

October 18, nineteen days after the first operation, ether was administered, the iodoform packing removed, and after breaking down a little of the fresh union in the wound, a thin plate of aluminium, curved to fit the shape of the skull, was slipped under the flap, so that it rested upon the bone on all sides of the opening in the cranium, and then the posterior part of the wound was closed with sutures. The brain just rose to the level of the skull after the packing was removed, presenting a red, granulating surface, bleeding but very slightly on withdrawal of the gauze. The following day the patient was perfectly well, able to see with the left eye (as tested by counting fingers) and able to talk as well as before. Beyond a very abundant flow of serous, probably cerebro-spinal, fluid, which soaked the dressing through repeatedly, there was nothing of note until the twenty-third day, when the temperature rose to  $101\frac{1}{2}^{\circ}$  F. and he had an epileptic fit—a general convulsion with loss of consciousness, followed by repeated vomiting. He was then found to have lost the sight of the left eye again. The dressing was cut down and the stitches were partly removed, with superficial primary union, and no perceptible rise of temperature. The following day the temperature remained elevated, but on the next day it fell to  $100^{\circ}$ , although the serous discharge continued and the dressing was changed. As there was evidence of retained secretion, a thin milky pus having collected, the sutures were entirely removed, the wound partly reopened and the plate removed. A light packing was inserted under the flap. With the exception of these two days the temperature was never above  $100^{\circ}$  throughout the case. The patient was given ten grains of bromide of soda three times a day, and this was increased later to fifteen grains.

November 3, Dr. Bull examined the eyes and reported choked disc in the third or atrophic stage, outlines of disc concealed, considerable exudation still present, but disc white and arteries small: iris dilated and irresponsive: no fresh hæmorrhages.

The wound contracted steadily, and on the 21st of November the patient was allowed his clothes and made to walk about the ward, as he had given indications of diminished mental vigor, and it was hoped to counteract this tendency. The bromide was reduced to five grains, three times daily. The patient, however, grew excitable and had both delusions and hallucinations, smelt bad odors, thought people were trying to poison or injure him, refused food, medicine,

etc., and this condition lasted until the end of the month, when the bromide was stopped entirely and he gradually returned to quietude, although he still remains in much feebler mental condition than immediately after the operation, and his aphasia is more marked.

The local condition at present (December 6) is that the wound has healed, except for a narrow and superficial sinus across the base of the flap, with a pocket anteriorly which holds about a drachm of fluid. There is also a smaller pocket just under the skin at the centre of the flap, corresponding to the site of the external tumor—evidently due to farther tuberculous infiltration. Both cavities secrete very little pus, and are steadily healing under iodoform-vaseline injections.

The patient is dressed and sitting up daily.

This case is of interest surgically, especially because of the external tumor and one or two points in connection with the operation. The external tumor led us to believe, erroneously, that we had to deal with a tumor of the membranes, perforating tumors of the brain proper being so rare. The hip-joint disease led us to a correct guess at the character of the mass. I have been unable to find any successful case of operation just at the critical moment when the eyesight was about to fail entirely, and consequently have no data upon which to estimate the danger to the eyes in operating in the presence of such conditions of the retina; but the question has little practical value, as the eyesight must be lost in any event before long, and in our case the only possible regret is the usual one, that the operation came too late to save the eyes.

Very noteworthy was the complete absence of shock during and after the operation, and this was probably due to the almost absolute bloodlessness of the separation of the tumor from the brain, which in its turn depended upon the fact that we were dealing with a tuberculous, and not a sarcomatous, mass. Finally, I would call attention to the circumstance that the operation was so conducted as not to open the dura until it was tolerably certain that the tumor could be removed, the first part being in fact only exploratory, in spite of the large opening in the skull, so that it would have been possible to close the wound at any time without having entered the true cerebral envelopes. This was the more necessary, as it was evident that we were attacking a very large mass, and



fortunately its superficial situation, lying as it did directly under the dura, lent itself to the plan. For the same reason, the size of the tumor, I felt unwilling to use the osteo-plastic methods which are so excellent in some cases, anticipating a very prolonged operation without them, and fearing to add to its duration and thus increase the shock which was dreaded, although happily without cause.

On December 21st, the sinuses having entirely closed, the patient was allowed to go home. The excitement of his return brought on a severe epileptic fit, followed by four others within three hours, without recovery of consciousness in the intervals. Two hours later one of us saw him, finding him unconscious, breathing stertorously, with pale, bluish skin, but full and rapid pulse, the brain bulging forcibly from the opening in the skull under the flap. There appeared to be no paralysis. The following day he recovered somewhat and tried to talk, but never fully regained consciousness, and died on December 23d. A post-mortem examination was made by us ten hours after death, the head only being opened. The wound was found to have healed entirely. At the site of the opening in the skull the skin was adherent to the dura, and was drawn in so as to make a very deep depression fully one and one-quarter inches in depth—a strange contrast to the protruding brain of a few hours before. The walls of this cavity in the brain were completely altered by tuberculous degeneration. The brain was very soft, and has not yet hardened completely. Practically all that remained of the left frontal lobe was converted into a hard tuberculous mass, with a large cavity below it full of soft cheesy material. The rest of that hemisphere and the right hemisphere showed no other foci of disease, but a softened area of considerable size was found in the left lobe of the cerebellum. Nothing has as yet been found to account for the paralysis of the external rectus of the right eye.

The disappointment in this case gives an additional reason, besides the usual multiplicity of the foci of disease, for not operating upon tuberculous cerebral tumors, for there can be little hope of radical cure when a tumor apparently so well encapsulated as this continues its growth on all sides in spite of what seemed a thorough extirpation of the disease.

# A METHOD OF TREATING COMPOUND FRACTURES.

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THE present paper deals with a method for treating compound fractures and with the results of that treatment as illustrated by the cases admitted into the author's wards at the London Hospital during the last six years.

The method aims at being simple, and in the following account it may be considered as applied to the commonest of compound fractures, viz.: those of the leg.

On admission, the limb is covered with lint soaked in carbolic lotion and is subsequently cleaned with the greatest care; protruding bone is replaced, loose or damaged bone is removed, and the broken ends are adjusted by means of splints with as little delay as possible.

1. Ordinary well-padded wooden splints are employed, but under no circumstances is the limb secured to the splint by means of strapping. Strapping may be used to form a stirrup whereby extension may be applied in fractures of the femur or humerus, but no form of plaster appears to be other than objectionable when the question of fixing the limb is concerned. If the strapping be adjusted with sufficient firmness, it will often be found that within twenty-four hours the limb has swollen and the strips of plaster are cutting into the soft parts and are impeding the circulation. The strapping then has to be cut or reapplied, and a second adjustment of the limb is rendered necessary. On the other hand, in process of time, the band of strapping is found to have come loose from shrinking of the limb, and a further readjustment of the fractured parts is called for. In the place of plaster, straps of fine webbing and buckles are made use of to secure

the limb to the splint. These vary in length, and are applicable to all parts. If found to be too tight or too loose they can be altered as often as necessary in the day without the least disturbance of the limb. In this way the limb can be secured with a proper degree of firmness. Where the webbing crosses the shin or the dorsum of the foot a small shield made of gutta-percha, and lined with lint, is interposed.

When side splints are employed these also are held in place by straps and buckles.

No bandages are ever applied. They are quite unnecessary. They cannot be readily tightened or loosened, and they cover up to an undesirable extent the damaged parts.

2. In the second place the limb is kept throughout in the open air. This would happen by necessity, more or less, in the case of the upper limb, but it is insisted upon also in all fractures of the lower limb in which there is a wound. If the principles of aseptic surgery be well founded, a worse atmosphere with which to surround a wound could scarcely be found than that which exists under the bedclothes. This atmosphere is confined, is hot and moist, and when flatus is passed or the bed-pan is used must of necessity become especially offensive. In all compound fractures of the leg or thigh the limb is kept throughout entirely uncovered as well by night as by day and in the winter as in the summer. In cold weather the nurse makes a cotton wool cap for the foot, but during the six years in which this rule of uncovering the limb has been observed there have been no complaints of chill or of evils arising from exposure. It might be mentioned that in the author's wards in all cases of wound of the lower limb, including amputation wounds, and in all cases of ulcer, the part is kept throughout the whole period of treatment uncovered save by the necessary dressings, and that since this plan has been adopted the results have been infinitely improved.

3. The third element in the treatment concerns the care of the wound. In cases of compound fracture there is usually a not inconsiderable amount of bleeding and an oozing from the wound which will often be continued for many days. It is very

desirable that this fluid should not be pent up in the limb, and that it should be allowed the freest possible means of escape. The plan of sealing the wound with collodion may be spoken of in general terms as bad. It can in no way control the oozing, which may long continue from the damaged parts, and merely confines within the recesses of the limb a fluid which is admirably adapted for the development of bacteria.

While a free exit should be given for all discharges of blood and serum such a barrier must, at the same time, be erected as will prevent the entrance of pus-producing bacteria. A dressing of antiseptic gauze wool may possibly meet these conditions, but in a large proportion of cases such a dressing needs to be very frequently changed, and such a change cannot always be effected without disturbing the position of the broken bones and putting the patient to no little inconvenience.

In the present collection of cases the wounds have been simply covered by a heap of dry antiseptic powder, which has been applied without stint. This covering of powder may be considered to seal the wound so far as the possible entrance of bacteria is concerned, while at the same time it in no way impedes the free escape of blood and serum from the damaged parts.

The discharge finding its way into the protecting powder forms with it a harmless scab or crust. As the powder becomes saturated more and more of it is applied, but the crust produced is not disturbed. In certain cases the oozing continues for many days, and in one or two instances the crust produced has exceeded the size of the adult fist. The powder employed has been iodoform or creolin. The latter has been found to be the more convenient. For the first few days the powder may need to be dusted on every few hours, and as the limb is kept always uncovered the saturation of the crust can be at once noticed. When no more blood is found to be escaping the powder is discontinued, and some seven days after this period the artificial scab is removed and the wound beneath may be expected to be healed or to be healing.

When the laceration occurs upon the upper surface of the limb there is no difficulty in covering it with powder. When it

is placed upon the sides of the extremity a platform of cotton wool must be so fixed in place that the powder when dusted upon it will bury the wound. The cotton wool may be kept in position by fixing it against the side splints, or by attaching it to the skin by gum.

The following advantages may be claimed for this method. It is simple and requires but the simplest appliances. The fracture when once adjusted need not be again disturbed. The damaged part is kept exposed to view, and the position of the ends of the bone can be ascertained at any moment. It may be claimed that the results, as shown in the subjoined table, are satisfactory.

The materials from which this table has been compiled have been collected by Mr. Y. Mills, the surgical registrar at the London Hospital.

The list deals with all those cases of compound fracture admitted into the author's wards during the last six years, which were treated in the manner above described.

The record commences in the year 1886.

From the table are excluded the following cases: Compound fractures of the skull; compound fractures of the limbs treated by primary amputation or by irrigation; compound fractures which had been under treatment before admission to the hospital, and in which suppuration had taken place before the patients came under notice.

Certain severe cases of extensive fracture in which death ensued within a few hours of admission, and before any definite treatment could be carried out, are also excluded.

There were sixty-one cases treated in the manner described. In forty-nine of these (eighty per cent.) the wounds healed without suppuration, and with a normal range of temperature. In seven cases suppuration took place, and after a more or less prolonged treatment the patient recovered and the bones united. In the remaining five instances a secondary amputation was carried out. Among the sixty-one cases there was one death.

## SIXTY CASES OF COMPOUND FRACTURE.

Primary healing,	49	cases
Suppuration,	7	"
Secondary amputation	5	"
<hr/>		
	61	" one death.

The following is an analysis of the forty-nine cases in which healing took place without suppuration. It will be seen that forty of the patients were males and nine females; that the greater number were between the ages of twenty and sixty, and that more than one-half of the total number of cases were fractures of the tibia and fibula. There was one compound fracture of the femur.

## FORTY-NINE CASES OF UNION WITHOUT SUPPURATION.

SEX.		AGE.					LOWER LIMB.				UPPER LIMB.					
Male.	Female.	Under 10.	10 to 20.	20 to 40.	40 to 60.	Over 60.	Femur.	Tibia.	Fibula.	Tibia and Fibula.	Foot.	Clavicle.	Humerus.	Radius.	Ulna.	Radius and Ulna.
40	9	0	10	16	20	3	1	3	2	28	1	1	6	0	0	4
																3
																0
																0

In these cases, as above stated, there was a normal range of temperature. In certain of the examples there was a rise above normal during the first twenty-four or forty-eight hours; a rise of temperature which is still, for want of a better term, referred to "traumatic fever." After this reaction had passed off the temperature remained in each instance normal. As a single exception must be mentioned the fatal case quoted below.

In many of these examples it is needless to say that the skin wound was small. In the smaller proportion of cases the laceration was considerable. The following selection of instances will illustrate the severer class of fracture.

M., 50. Fall from height. Compound fracture of tibia and fibula. Bones laid bare to the extent of two and one-half inches. Dislocated shoulder.

M., 54. Patient subject of alcoholism. Compound fracture of tibia and fibula. Two wounds in the skin. Both bones exposed.

M., 14. Railway accident. Compound fracture of tibia and fibula. Extensive laceration. Sutures inserted.

F., 40. Accident during outburst of insanity. Compound fracture of both legs. Patient difficult to restrain.

F., 56. Ridden over by cab. Compound fracture of lower end of humerus. Two wounds. Largest three-quarters of an inch in length.

In three instances projecting portions of bone were sawn or chipped off. In four cases an attack of delirium tremens followed the accident.

The single fatal case comes among this list of those in whom primary healing occurred. The patient was a man aged sixty-nine. He had been ridden over by a cart, and had a compound fracture of the leg. The bones were much displaced, but the wound was small. It healed without a sign of suppuration. The patient was a drunkard. He soon became delirious and, sinking into a typhoid state, died of hypostatic pneumonia on the twenty-eighth day.

In the seven examples in which suppuration took place, all the patients were males and their ages ranged from fifteen to forty-five. The fractures were in every instance the result of direct violence. The bones broken were in two cases the tibia and fibula, in four cases the tibia alone, and in one example the radius and ulna.

One patient is spoken of as a drunkard, but the others appeared to have been in sound health. In two cases bone was removed before the dressing was applied. In both these instances and in one other necrosis followed.

In one case erysipelas supervened on the tenth day and in another case at a later period. The length of time which elapsed between the accident and recovery ranged from fifty-three to one hundred days.

In the five cases of amputation the fracture was treated on admission by the method already described. In due course sloughing and suppuration took place, and the damaged limb was removed. All the patients recovered.

In one case, a man aged 32, the right foot was crushed.

The patient developed delirium tremens and was found to have albuminuria. The foot was amputated on the sixth day. In the other instances the amputation was at a later periods, respectively on the twenty-second, fiftieth, sixty-second and sixty-ninth days. The youngest patient was 12, the oldest 63. One was a Pott's fracture, two involved the tibia alone and one the humerus. In all suppuration took place, drains were inserted and free incisions made, and the limb was treated by liberal irrigation.

This series of cases serves to illustrate incidentally the gravity of compound fractures of the tibia alone. Nine examples of this injury are included. In three union took place without suppuration; in six, severe suppuration followed, and in two of these instances the limb was ultimately amputated.

Such cases of compound fracture as were not treated by the method described in this paper, and were, on the other hand, not considered to be demanding amputation, were treated by copious irrigation.

By means of a special tank apparatus, permanently erected in the ward, a stream of cold or warm water, running at the rate of thirty gallons an hour, could be passed over and through the damaged part.

With this measure some very satisfactory results have been obtained.



# VEGETABLE PLATES IN BOWEL AND STOMACH SURGERY; A DISCUSSION OF THE PROPER TECHNIQUE.

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AT intervals during the past summer and up to date, the writer has been interested to observe, in some dozen or more medical journals, several of which were kindly mailed him by friends, reviews of an article by Dr. R. von Baracz, of Lemberg, which appeared in the *Centralblatt für Chirurgie*, June 11, 1892; also of another by the same gentleman in the *Archiv für Klinische Chirurgie*, Vol. XLIV, pp. 513-591.

The *British Medical Journal*, *London Lancet*, *New York Medical Record*, *New York Medical Journal*, *American Medical Journal* and the *Therapeutic Gazette* are a few of those which I remember; and last, not least, the ANNALS OF SURGERY, which considered the subject-matter of sufficient interest to discuss it twice—in its issue for September, and again in that for November. The latter review covered two pages.

The subject was the use (for which Dr. von Baracz claimed originality) of raw vegetable tissue as a material out of which to carve plates for intestinal anastomosis, gastro-enterostomy and similar operations; and because this widely-spread statement does me an injustice by attributing to another a method of my own devising, I beg the privilege of this correction, and at the same time will mention certain advantages of a plan which I think deserves to be better known.

Dr. von Baracz reports a series of experiments upon dogs by the means named; and his studies led him to prefer plates cut from the Swedish turnip to other kinds of raw vegetable tissue. The results of these experiments were so favorable as to induce him to try such plates upon the human subject.

Accordingly he did so on May 7, 1892, doing a gastro-enterostomy in a case of cancer of the stomach by the aid of the raw turnip plates. The patient recovered.

The surgeon was pleased with the method, and Dr. Richard Heigl, surgeon-in-chief of the Bürger Hospital of Coblenz, also employed it on July 20, 1892, in a gastro-enterostomy, using turnip-plates. This patient also recovered, so far as they could speak at the time the article was printed. Dr. Heigl, it seems, "praises these plates as better than Senn's."

Dr. von Baracz is, of course, unaware of his being second to myself in this field; and indeed I am glad to have had the independent work and corroboration of so able a surgeon. If, however, he will refer to the *New York Medical Record* for June 27, 1891, he will find that the writer published therein a series of experiments upon dogs, using just this method, the last seventeen of which were in every instance followed by recovery.

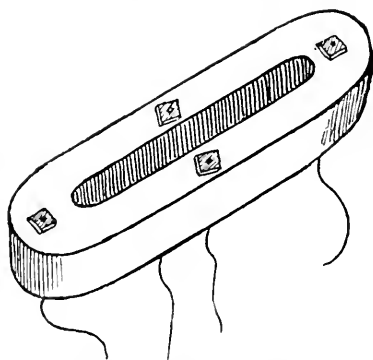


FIG. 1.—The potato plate ready for use (threads short and needles omitted).

The dogs were finally killed, and some two dozen specimens, together with a detailed report, were presented at a meeting of the surgical section of the New York Academy of Medicine.

Most of my spare time during the winter of 1890-1891 was devoted to such experiments, with plates cut from various kinds of raw vegetable tissue, in the Physiological Laboratory of the College of Physicians and Surgeons, this city.

Dr. von Baracz states that he began work in this line a year before his first paper was published, June 11, 1892. Therefore it will be seen that my experiments antedated his by at least six months, and my publication thereof by about a year.

In my *Record* article mentioned, occurs the following sentence: "I have experimented for some months, and used

many kinds of raw vegetable and fruit tissue. That which I like best for several reasons is raw potato." Raw turnips, carrots, sweet potatoes, parsnips and several other vegetables were tried, as was stated in the discussion following the reading of the paper, and on the whole the writer somewhat preferred, and still prefers, the white potato. When soaked for an hour or so in warm or tepid water (*not* carbolic, which softens it), it becomes as rigid almost as wood.

This is probably due to swelling of the starch-granules; but is not accompanied by any marked change in shape of plates already cut out. After remaining for a few hours exposed to the digestive fluids of either stomach or bowel it begins to soften, while retaining its shape. At length it is completely digested and disappears, this occurring at a period of time varying according to what part of the alimentary canal it occupies. But always during the first ten or twelve hours at least—the time in which most of all we fear leakage at our anastomosis—it holds the peritoneal surfaces smoothly in contact.

In this length of time, or even half of it (if we have lightly scraped the surfaces to be apposed) we may be sure of firm agglutination. And after these hours of peril the softened plates yield to peristalsis, and quite easily cut free from their plate-sutures, taking themselves out of the way.

Contrast this with Senn's plates, occasionally sliding on each other and obstructing the opening; and requiring at least a week or so to be removed after they have ceased to be needed; tedious to prepare; expensive; requiring multiple sizes for various contingencies; not to be gotten in emergency; as to the opening, too small-sized. Whereas, on the contrary, these vegetable plates serve every purpose of Senn's; are more quickly softened and absorbed when no longer needed; carved in a minute; always at hand; may be made, if desired, with a four-inch opening; and are devoid of cost.

The various catgut substitutes for plates are of comparatively little value because even after an hour in the wet, warm faeces they lose all rigidity, becoming absolutely limp. The same with segmented rubber rings filled with catgut strands.

In this country, to my knowledge, the vegetable plates have only been used once upon the living human subject, and in that instance, a year or so ago, by Dr. Andrew F. Currier, of this city.

I have a letter from this gentleman, giving the following details :

The operation, one for ovarian tumor, was difficult in the extreme, because of extensive and very firm adhesions. It had already lasted three hours or thereabouts when he tore into the ilium, the rent being of such a nature as to preclude closure by simple suturing. He should now (as he states) have made an artificial anus, instead of further prolonging the operation ; but instead sent for a potato, made and used the plates, performing a lateral anastomosis by their aid. The patient died within a few hours after, of shock. This case, of course, neither counts for nor against the vegetable plates.

About the time, not far from two years ago, when I first read the paper at the Academy upon this subject, I presented these specimens, and a thesis upon vegetable plates in intestinal surgery, in competition for a certain prize offered by the College of Physicians and Surgeons of New York.

The conditions under which the prize was offered demanded *original work* on the part of the competitors. There were three judges, of whom one only is a surgeon.

That committee decided not to award the prize that year, for the (publicly-stated) reason—note this—that none of the essays showed evidence of original work !

And now, after this lapse of time, comes forward this German surgeon, he also supposing his more recent work on the same subject is original ! And Drs. Bergmann and Billroth, by allowing him nearly eighty pages in a recent number of the *Archiv für Klinische Chirurgie*, of which journal they are editors, show that evidently they think it both new and of some value.

In the *Centralblatt für Chirurgie*, too, Drs. Bergmann and König index it under the head of "Original Communications."

It must be really just a trifle amusing to the surgical mem-

ber of that prize committee, he having all this while refrained from mentioning who *is* the real originator of this method!

I should have had no cause for complaint had the committee, in reporting adversely to my claim, given as their reason that none of the competing theses showed evidence of work of enough importance to science to deserve the prize. *That* might fairly be the decision at a time when, as now, the sentiment among most surgeons is against the use of plates or rings of *any* kind in intestinal work. Personally, however, I feel convinced that the present drift toward the older plan of suturing without such aids is a distinct retrogression, and will not long remain in favor.

It has been my lot to have abundant opportunity to try all the different methods as they have appeared from time to time, both upon dogs and in my operative surgery courses at the Polyclinic, and I am of opinion that, while in certain situations plates cannot be used, in general they can and should be, for one prime reason—speed. There can be no question in my mind after having demonstrated anastomosis by various plans almost every week, except in summer, for the past six years, that on an average ten to fifteen minutes will be saved by plates.

Speed, breathless speed, is, next to cleanliness, the keynote to success in abdominal work. It is only too often neglected, the patient “dying cured” in consequence. Ten minutes, even five minutes more with the abdomen open, may make all the difference between life and death.

I confess that I cannot see the logic in the following quotation from a recent article by Dr. Robert Abbe,<sup>1</sup> in which he takes somewhat different ground:

“The anastomosis was quickly completed, and the cleansed parts dropped back. The time of the anastomosis was forty minutes, but inasmuch as the entire operation, including search, separation of old adhesions, resection, etc., with concluding closure of the abdominal wall, occupied over three hours, I am free to confess that, to my mind, it makes little or no difference whether the time given to the act of uniting the bowel was thirty minutes or forty.”

<sup>1</sup> New York Medical Record, April 2, 1892.

To the writer it seems as if this added ten minutes were of even infinitely more gravity to the patient, in such case, than if the operation had been only a short one.

Regarding the question of safety (aside from the factor of speed) by bowel work by either method, two points are often neglected, and as I believe to the patient's peril.

The first is the *scraping of the peritonæum lightly*, wherever adhesion is desired. This can be done in a few seconds, and should not cause bleeding, if properly performed, but simply congestion; and because of this, a more rapid and certain plastic exudate sealing the apposed peritoneal surfaces.

Oddly enough, Dr. Abbe objects to such scraping, on the ground of unnecessary loss of time!

This matter seems to the writer hardly open to argument. Twenty cases in which rapid adhesion of *un-scraped* peritoneal surfaces has occurred would prove nothing herein, when compared with one in which smooth and unscraped peritoneal surfaces did *not* become agglutinated after a prolonged contact. Dr. Davis, among others, has reported an instance of this latter, although the surfaces were in contact many hours after being sutured.

A light scraping, as he first demonstrated, will render certain the formation of very firm adhesions within even three or four hours.

The second point which it seems to the writer is commonly neglected, although of utmost value, is always to give the patient, even before the anæsthetic, as large a dose of morphine by needle as is compatible with safety to his life.

In the first place, by following this procedure, much less ether or chloroform will be needed than if no morphine be used. And the consequent liability to vomiting, with its attendant risk of tearing out or loosening sutures, etc., is hence largely avoided. Probably, too, morphine is of some little value as a prophylactic against shock from the severe operation about to be undergone. I quite agree with Dr. John B. Roberts,<sup>1</sup> who, in discussing operative shock, says: "The preliminary hypodermic

<sup>1</sup> Am. Journ. Med. Sci., 1892, p. 258.

injection of morphine and atropine, always given a quarter or a half-hour before commencing anaesthesia, probably lessens the shock, and without much doubt diminishes the tendency to vomiting after etherization has been discontinued."

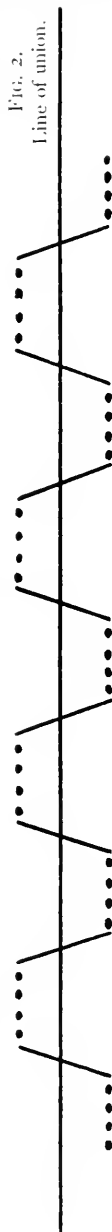
In the second place, because of that morphine, the bowel will be absolutely quiet, absolutely devoid of peristalsis, for hours afterward; and this is just what we need; *splinting* that gut for a short time.

Peristalsis during these critical hours before fibrin has sealed the spaces between our stitches, is fraught with such danger, that to permit it is almost like inviting a possible leakage, by forcing out a drop, here or there, of liquid poison.

Should we refuse morphine, we cannot depend for safety upon the paralysis, however commonly present, of the loop recently subjected to operation. For, although this portion may be quiescent, for some hours, yet the whole alimentary tube above will not be so! And semi-fluid fæces are being hurried along in surging currents, thrusting forcibly against the newly placed barriers, whether of thread or plates.

Indeed, it is only because I also insist upon the use of morphine as stated, that I think the use of plates absolutely safe without a complete row of stitches about them. During the hours while the plastic exudate from the lightly scraped peritoneum is sealing, more firmly than any sutures could seal, that wound, the intestine is as devoid of motion as if dead.

Let me here interpolate the remark that if the patient's general condition were excellent, and the abdominal cavity had not been very long opened (not otherwise) I should as precaution upon precaution, sew once entirely around the plates a running Lembert, or some similar stitch, such as that elsewhere illustrated (See Fig. 2.) And because of the smooth tension made possible by the plates, this sewing could be com-



pleted quite a little sooner, as well as more safely, than otherwise. In dealing with the lower half of the ilium, the danger of an occasional complete penetration with the needle is a very real one, save in expert hands—so very thin-walled is this part of the intestine.

To return to the question of a *morphine-splint*: The writer is not ignorant of the views upon peritonitis held by Lawson Tait and many other surgeons. The writer acknowledges the wisdom of its treatment, or better, prevention, by saline laxatives; but submits that here (as distinguished from ovarian or uterine surgery) exists an indication of the strongest kind for the use of morphine. And in the great majority of instances of this particular class of abdominal work, that indication outweighs, in his judgment, the arguments on the other side. Furthermore, it must be distinctly understood that the writer would not at all approve of continuing for an indefinite period to exhibit morphine, following bowel and stomach operations. When ten to twelve hours have elapsed, then we can feel assured that firm agglutination has occurred between our lightly-denuded peritoneal surfaces; an adhesion so firm as almost to tear elsewhere rather than yield at that spot. And now, the liability, or even the possibility, of leakage being practically past, the writer would, from this period *post operationem*, give hourly small doses of saline laxatives; and perhaps also a glycerine enema, should there be some tendency, then or later, to abdominal distention. Under this line of treatment the effect of the morphine upon intestinal peristalsis is, within a few hours, overcome; and usually quite readily so.

And what, now, becomes of the five-inch plates of potato or turnip within the gut?

After twenty-four hours, or if high in the intestinal canal, perhaps even a somewhat lesser period of exposure to the heat and digestive fluids therein, the plates will readily yield to the waves of peristalsis, first permitting the freest passage of feces through the four-inch lumen, and presently cutting out at the plate-stitches because of extreme softening; and they will be swept away. Their four stitches, if, as seems preferable, of catgut rather than silk, are soon after absorbed and also disappear.



Perhaps the most recent of the plans now before the surgical world for anastomosis without plates or rings is that by Dr. Abbe, and which he affectionately describes as "the perfect technique of suturing." Briefly, this consists in a series of three concentric lines of continuous silk sutures about the new opening. The first of these—that is, nearest the cut—binds the wound-edges together, going through the entire thickness of the gut-wall; and is meant to check any bleeding. The second surrounds the wound a quarter of an inch distant from its edges—a "running Lembert;" and the third is again a quarter of an inch away. Of course, the order of application is not this, and very wisely; as much as possible of the sewing being completed before the bowel is opened. The writer has now demonstrated to classes this plan a good many times, and just as described by Dr. Abbe. As compared with plates (even when those plates have had a line of continuous suturing run about them), there cannot, it would seem, be any doubt that the former method compels at least ten minutes more of peritoneal exposure. If that added time would produce any added safeguard to the patient, as compared with plate-work, then Dr. Abbe and I would agree instead of amicably differing as to technique; but I think the reverse is the case. Still, let me add that I admire Dr. Abbe's artistic work; and that no one better than he can accomplish for a patient whatsoever lies in suturing deftly and with dextrous fingers. I agree, too, in his view "that lateral anastomosis" (as distinguished from end-to-end reunion) "properly done, is eminently the safest and best method of restoring the canal in most cases."

Also, I think that no lateral method should be considered for a moment which does not make provision for at least fifty per cent. contraction of the new opening, in the course of a few months to a year or more. Therefore the new and ingenious plan of Dr. J. B. Murphy of Chicago, with metal buttons, is not properly to be thought of in this matter. In performing cholecystenterostomy it really seems an ideal plan; but upon stomach, and in uniting bowel to bowel, because of the primary small caliber of the new opening (still further to be reduced with time), I venture to predict a justified lack of acceptance by the profession.

The writer will not in this article go over again the much-trodden field of discussion in pointing out in full the objections to any end-to-end device for bowel re-union. He wishes in conclusion simply to state in some detail a method of lateral anastomosis with plates, now practiced by him since the winter of 1890-91 (in entero-enterostomy only). In such operations—not very rarely needed, following, for instance, dead gut from a strangulated hernia, or resulting from tearing into the alimentary canal during separation of old adhesions in major gynæcology—the technique about to be described possesses two advantages over any other, with plates or without them. These are: (1) Opportunity to test by the water-test the perfection of the line of suturing. (2) Entire avoidance of possible infection of the line of intended adhesion by repeated accidental dragging out, necessitating tucking back of the cut bowel-edges, which are none too thoroughly disinfected at the best.

Regarding the first point (the hydrostatic test), it is with surprise that the writer has noted how little it has received attention. If the operator means to depend solely upon suturing for his union, one would suppose that from a half minute to a minute more spent in proving such stitches evenly and properly tight would be anything but wasted. Indeed, in the bladder this is commonly done. For instance, in the article repeatedly quoted, Dr. Abbe gives an example of this. It was in the first patient mentioned. Here, in dissecting adhesions, he tore into this viscus. This rent he “immediately sewed up and tested by forcing Thiersch’s solution into the bladder *to prove its perfect closure.*” Nevertheless, the gentleman regards this same procedure, as applied to bowel surgery, unnecessary and a waste of time.

The error lies in closing the bowel-ends *first*, and *then* making the lateral anastomosis, with its surrounding lines of suturing (or plates). Such technique of course prevents the water-test. If instead, as suggested by me, these steps be *reversed*, then by running a stream of warm water into one gut-end, through the new lateral opening and out of the other gut-end, how easy it is, in a moment, to notice a point of leakage and to correct it by an additional stitch! The tapes or clamps, always applied a few inches

away, of course prevent the water from taking another path than that desired. And *then* the bowel-ends are to be inverted and closed, instead of having made this the first step of the operation.

And how much more pleasant, so to speak, for the patient, to have a stream of leakage thus discovered, rather than subsequently upon the autopsy table!

As to the second point in technique mentioned, let me quote from a recent article by Dr. Robert F. Weir:<sup>1</sup> In speaking of anastomosis he says:

“I had already called attention . . . to the tendency of the opposed intestinal incisions to slip out beyond the rings. This also occurs with Senn's plates, and, in fact, is common to all of these contrivances, so that special care in their use is demanded, and often the escaping portion requires to be tucked in between the plates more than once, before the restraining outside sutures are finally inserted.”

Had Dr. Weir used the method about to be described, he would not have had this complaint—and it is a just one—to make, regarding the usual methods either of suturing or of using plates. By the writer's plan, any and all sewing to be done about the new opening is completed *before* that opening is made, and for just the reason given.

*Preparation of Plates.*—These are cut one-third of an inch in thickness, and on an average five inches, or nearly, in length. Their width is not great, allowing them to slip easily into the bowel. At first I made them too wide. A very narrow slit is all that we need. The powerful circular muscles cause the cut bowel-edges in the slit to retract so that they do not touch each other, and the prompt infection of these edges by feces prevents the likelihood of their adhering even if they did touch. The slit should be nearly or quite four inches. Of course, this length is an added safety, immediate (as well as remote) because the freer the passage of feces, when that begins, the less the strain on the integrity of the line of union.

Each plate is armed with four coarse catgut threads, not over nine inches long, to avoid tangling. The threads have a large knot, and before penetrating the plate we sew through a

<sup>1</sup> N. Y. Med. Record, April 9, 1892.

scrap of rubber cut from a drainage tube, or, lacking this, a minute bit of cloth: this to avoid cutting through. If no running line of sutures about the plate is contemplated, it will be best to use *silk* instead of four threads in each plate. Tie with a single knot each thread in the eye of its needle (a round, straight milliner's needle); this to prevent accidental unthreading at an awkward time. The needles should all have their points buried in bits of potato, each about the size of a pea. If time permits, immerse the plates for a half hour in warm water, to make them more rigid and hard.

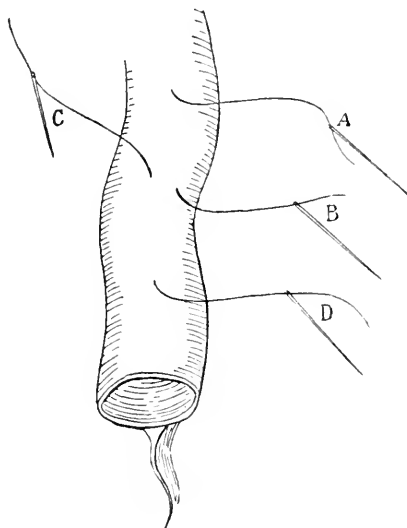


FIG. 3.—A plate in place and ready to tie to its fellow.

*Method of Using the Plates.*—Assume that the tapes or clamps are applied, and the bowel properly cleansed out by irrigation. Now—

(1*a*) Seize a needle with the needle holder so that it shall be in the long axis of the holder. Begin with the one marked *A* in the accompanying diagram (Fig. 3). Pass the needle several inches (about seven in operation upon the small intestine) into one of the open gut-ends, and when the place is reached at which, in the judgment of the operator, it should come through, detach the bit of potato from its point with the fingers, seizing it from

without, and then pass the needle through and out. The little piece of potato will take care of itself, dropping to the bottom of the bowel; it is insignificant. The spot at which the end sutures, *A* and *D*, should escape, is one directly opposite the mesenteric attachment; that is, as far as possible from the mesentery. Now (after *A*) pass needles *B* and *C* in the same way. After each thread is passed, it should be held by an assistant tense against the wall of the gut on the side where it belongs, and the next needle should carefully run along the opposite wall; this to avoid tangled threads. Pull lightly on threads *A*, *B* and *C*, while pushing the plate from behind, drawing it thereby into place within the intestine. Push rather than pull, to avoid oblique tension on the threads and possible cutting of the plate. Next pass *D*, and draw it also taut.

Go through the same steps with the other plate and the other gut-end. Always leave at least a full inch and a half between the plate-end and the gut-end, in each instance.

(1*b*) The following alternate method of introducing the plate and its threads is, so far as the suggestion of the shorter needles is concerned, due to Dr. H. M. Hall, of Seattle, Washington, who recently took an operative course with me. The plate is to be armed with four (or six) short, straight, round (so-called gynæcological) needles, only one-half to two-thirds of an inch long. Their threads need not exceed four inches in length. (In other respects they are prepared as in the other plan). These needles are inserted into the plate at their proper places, and their points made to penetrate just to the thickness of the plate, but no further. (These preparations are, of course, made before the operation begins.) The plate thus prepared is laid, needle-hilts downward, upon a thin, long strip of wood, as wide as the plates—a piece of cigar-box, for instance—and both are inserted together a sufficient distance into the intestine, from its open end. By placing the four short plate threads each on its own side of the wooden strip, tangling during the insertion is avoided. It is now the work of but a moment to press upon the bowel overlying the plate, and thereby force the needles through at exactly the right places. Their points are seized by the needle holder, and each is drawn through until its thread is tense.

By this technique, which I prefer to the other, both plates may be inserted and their threads tied in less than two minutes. The former technique would be necessary where only ordinary needles are procurable, *i. e.*, in emergency work.

(2) Wipe off the threads with a cloth wet in some antiseptic solution. Of course this is not essential, but is a safeguard.

(3) Scrape lightly but thoroughly with a scalpel the surfaces to be coapted; this also includes the ends to be inverted.

(4) Tie the four anchor (plate) threads each to its appropriate fellow, being careful to draw snugly but not to make extreme pressure. Tie first the threads on the lower (under) side of the seat of operation. Sloughing is of course possible if no care is used; though because of rapid softening of the plates inside of twenty-four hours it is less a danger even in careless hands than if bone plates were used.

Experience proves that it is of little moment in which directions the open ends are pointed, before this ligation of the threads; that is, whether in opposite directions or not.

(5) Take one square Lembert stitch at the plate-edges, opposite to and concealing each of the four (or six) plate-stitches. This is precautionary. In the event of a drop of pus forming where a plate-stitch penetrates the gut (infection by capillarity), that pus, like any other fluid, would move in the direction of least resistance, and, the softened plates not opposing, would be obliged, by this square stitch, to re-enter the intestines at the cut edge.

As an alternate choice—and perhaps preferably to such interrupted stitches—we may, as a matter of convenience, begin the entire operation by a straight, running line of suture five inches long, between the loops to be joined, and about one-fourth inch from their mesenteric border. This line, may if desired, be continued and carried completely around the plates, after these have been tied together. The stitches are rapidly inserted, being no more than three to the inch, and are preferably of the kind illustrated in Fig. 2. The surfaces are smoothly coaptated, and sloughing, from over-tension, is hardly possible; because the pressure from any stitch of this continuous thread is not met by that of an opponent across the line of union.

Just as in suturing without plates, about the opening, great care should here be exercised lest the surgeon sew too deeply and penetrate into the bowel. As has been previously remarked, the smooth, though moderate, tension about the plate-edges permits very rapid and accurate sewing.



FIG. 4.—The suturing about the plates is completed; the anastomotic opening is being made; in short lines the row of sutures is indicated roughly. (When properly tightened, the sutures cannot easily be seen, of course.) Sharp-pointed scissors should be substituted for the knife, in this illustration.

If the patient were in real and immediate jeopardy, I would advise not stopping for sutures at all; but, as the end of the bowel technique, to wrap around the plates at their line of union a long strip cut from the omental edge. A preliminary cobbler's ligature to the omentum will avoid loss of blood here. This, by actual count, may be done in one minute. Such an omental

strip is stated by Senn to be almost sure to live, though completely detached, becoming firmly adherent where it rests, and is a decided additional safeguard against possible leakage, with consequent infection.

(6) Run into one open gut-end a thin strip of wood as wide as the potato-plate. This is to cut against.

(7) Now we make our opening through the opposed and sealed gut-walls. I strongly advise for this purpose straight, sharp-pointed scissors, instead of the bistoury indicated in the illustration (Fig. 4). If desired, by a little trouble, the bowel-end may be so held as to render the line of incision visible its whole length; but this is hardly worth while, as with the scissors one can very easily feel, before cutting, the slit in the plate, and thus be exactly guided. We should make as long an anastomotic opening as the plates will allow. The strip of wood opposite, which has prevented cutting too deeply, is now removed.

Should bleeding follow, of more than trivial degree, it could easily be controlled by forceps. As stated, the incision is open to inspection—from either end—with a little care. Also, the potato is elastic enough to permit, without harm, a temporary widening of the slit by any blunt means, for greater ease in seizing a vessel.

However, annoying bleeding is very unlikely to happen, both because the point at which the bowel is divided is that farthest from the mesentery, and, therefore, where the vessels are smallest; and, also, for the reason that the moderate pressure of the plates would tend to check it.

(8) Irrigate. Under very gentle hydrostatic pressure, closing the outlet end with finger and thumb for a few moments, the line of suture, or union, should not leak, if contact is properly made.

(9) Invert and close the ends, each with one running line of suture, as in Fig. 2. The free end is seized with dressing-forceps and turned in until the plate is felt. The forceps holds it thus inverted, while the stitches are placed. The long intussusceptum, far from being the danger that was once feared, proves a decided protection against leakage. A few needles, temporarily thrust through the intussusceptum transversely, prove of aid in preventing the rolling out of a part of the end during sewing.



(10) Take a stitch or two between the blind ends and the bowel, against which each should rest, first scraping lightly. This sewing prevents possible forcing of another loop into this angle, with resultant undue tension on the stitches at the plate-ends; an accident which led to leakage in one of my first experiments on dogs. It is also a safeguard against intussusception into the new opening, which has been observed by one worker in this field (Robinson). Of course, this point in technique is as applicable to lateral anastomosis without plates as with them.

Finally, of course, we remove the clamps or tapes from the bowel on either side of the region just subjected to surgical treatment.

For the sake of clearness, ten successive steps in performing the operation have been numbered and itemized; but it will be noted that half of these are not peculiar to this, or any other plate method, but are just as advisable when suturing alone, without such aids, is attempted.

I know of no briefer, no safer plan. It is my hope that the points discussed in this paper, and which the reader may not heretofore have put in practice, will be accorded an unbiased trial. They are the fruit of a number of years of work in this line; and the conclusions have not been drawn without time for consideration.

THE RELATIONS OF THE GROSS ANATOMY OF  
THE VERMIFORM APPENDIX TO SOME  
FEATURES OF THE CLINICAL HIS-  
TORY OF APPENDICITIS.

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THE abstract anatomy of any part of the human body is practically of as little use to a physician and surgeon as are bricks and mortar to a builder when considered independently of each other for building purposes. While the study of anatomy is both interesting and instructive to the practical physician and surgeon, even when disassociated with its applied utility, still it becomes doubly so when the anatomical facts are taught as aids in diagnosis and treatment. I intend no disrespect to a branch of medical study with which I have been long associated, when I say "that a knowledge of anatomy is of but little use to the physician or surgeon except in its relations to the pathology, clinical history and treatment of disease and injury; and, furthermore, is taught best in connection with them." I approach the consideration of this paper's title thus indirectly in order that I may here express my opposition to the plan of teaching abstract anatomy only, and urge its presentation on the practical basis mainly, since the chief benefits are derived from its practical, or applied, use in medicine and surgery. It is my purpose to-night to demonstrate especially the important relations between the clinical histories of cases of appendicitis in many respects, and the varying anatomical arrangements of the vermiform appendix itself. Several years ago I requested Dr. H. M. Biggs, then, as now, a curator at Bellevue Hospital, to collect for me the following data regarding the relations of the vermiform appendix and its associated tissues, and also to note the presence of any

change in its contents, size, etc., which might appear in the cases coming under his observation in autopsies made for other reasons than diseases of this appendage. Dr. Biggs was requested to note the age and sex of the subjects, together with the length, diameter, contents, direction and position of the appendix, and the characteristics of its mesentery. Several months ago Dr. Biggs kindly handed me a list of the facts as developed by the examinations in 150 autopsies. In 131 of the 150 cases ninety were males, forty-one females, and in nineteen the sex was not stated.

*Length of the Appendix.*—The average length of the appendix in the male cases was three and five-tenths inches; in the female, three and one-tenth inches; in those in which the sex is not stated, two and three-fourths inches. It appears, therefore, from these cases, that the appendix of the male is four-tenths of an inch longer than that of the female. The extremes of the male series (90) were respectively eight inches and one-quarter of an inch in length, there being but one of each of these. Four were found between one-half and one inch in length, seven between one inch and one inch and a half in length. About fifty per cent. of the male series (90) were from four to six inches in length. The extremes of the female series (41) were seven inches and one inch in length, there being but one of each of these. In no instance in this series of cases (144) has there been noticed an appendix of the extraordinary length sometimes recorded.

*Origin of the Appendix.*—It is interesting to note the differences in the origin of the appendix from the cæcum. In the cases on which this estimate is made, the ileo-cæcal valve, or practically the implantation of the small into the large intestine, is taken as the point of departure. In forty-seven (56 per cent.) of a series of eighty-two male cases, the appendix arose one inch below the valve and posteriorly. It arose three-fourths of an inch below the valve and posteriorly in ten instances; one and a half inches below the valve and posteriorly in seven instances; one inch below and back of the valve in five cases; just below in one; one and a half inches below in six; external to the mesocolon in one; one inch external to the valve in two; from the apex of the cæcum in one. Other points of origin were noted by

Dr. Biggs, but since they are slight modifications only of those already mentioned, they are not deemed of sufficient significance in this respect to entitle them to separate mention. Thirty-five of the female subjects showed that forty per cent. (14) arose one inch below the valve; in seven instances, three-fourths of an inch below; in three instances, one and one-half inch below; in three instances, one-half inch below; and in one case from the apex of



FIG. 1. POSTERIOR VIEW.—Showing ilium coming out of pelvis, passing in front of a large appendix, which turns to the left in a hooked manner, held in position by a short mesentery. Appendix continuous with the end of an insignificant caecum.

the caecum itself, the same as in the male series. It arose also in two additional instances behind and immediately below the valve. It is not necessary to use further words in this connection, as sufficient information is already revealed to demonstrate substantially that in one-half of the cases of both sexes the established point of origin of the vermiform appendix is one inch below the valve, and on the posterior surface of the caecum. It is interest-

ing also to note that forty per cent. (34) of the remaining male series are not at a greater distance from the valve than one and a half inches. It follows, therefore, that finger-point pressure, when directed from without, will invade the origin of the vermiform from the cæcum in not less than ninety-six per cent. of all male cases. An examination of the data bearing on this point, referable to the female sex, exhibits no material difference in this regard. Curious instances of origin of the appendix are noted, as in one of the male series it arose external to the meso-colon, and in one each of both sexes it arose from the apex of the cæcum. (See illustrations).



FIG. 2. POSTERIOR VIEW.—Showing appendix confined in position by short mesentery and lying behind the ilium. The relations of the origin of the appendix and the ilium with cæcum substantially normal. All of the appendix except the origin and termination inclosed between the layers of the iliac mesentery.

*Diameter of the Appendix.*—The stereotyped expression employed in anatomical works, characterizes the diameter of the appendix as about that of a "crow's quill." The exact average diameter in a considerable number of cases is not devoid of interest, since it bears on the importance of any unusual increase in size that may appear. The comparative diameter of the vermi-

form appendix as bearing on the sex in these cases, shows that the appendix of the male averages about one-tenth of an inch in diameter greater than that of the female. The estimates made are based on the data of twenty cases of each sex selected from the entire list indiscriminately. It is of interest to note that in seventy of the male series there are found nine instances in which the diameter of the appendix is reported at five-sixteenths of an inch, and in all but one (89 per cent.) of the nine the appendix contained fecal matter, either hard or soft, principally the latter, or



FIG. 3. POSTERO-INFERIOR VIEW.—Showing (1) cecum covered with peritonæum on anterior and lateral surfaces only; (2) distal third of appendix enveloped with peritonæum, proximal two-thirds covered by peritonæum on anterior surface only, posterior surface extra-peritoneal; (3) appendix arising from end of cecum, continuous with perpendicular anterior band; pouching of cecum on either side. Contrast with fetal type (Fig. 4).

mucus. In some of these cases both of these substances were noted. In the exceptional case of this series the tube was entirely empty. In ten of the seventy cases the appendix was three-sixteenths of an inch in diameter, and of this number six (60 per cent.) contained fecal matter. Thinking that an increase in the size of the tube above the average implied the presence in it of fecal or other unnatural contents, in amounts proportionate to the increase in the diameter of the appendix, I examined the records of the contents of all those reported as one-fourth of an inch in diameter in seventy male cases, with the follow-

ing results: Of these seventy, there were found thirty-six, each being one-fourth of an inch in diameter; of the thirty-six, twenty-five (70 per cent.) contained fecal matter or mucus, and eleven were empty. According to this showing, the greater the diameter of the appendix, within apparently normal limits, the greater the probability of the presence in it of fecal or other matters. To recapitulate: In those appendices five-sixteenths of an inch in diameter eighty-nine per cent. contained fecal or other material; in those four-sixteenths of an inch in diameter nearly seventy per cent. contained similar products; in those three-sixteenths of an inch in diameter sixty per cent. were



FIG. 4. ANTERIOR VIEW.—Showing (1) fetal type of cæcum very small with appendix attached to extremity. Appendix is also very small, almost like a fibrous cord, and has a long, broad mesentery. Anterior band is not continued on to appendix.

invaded in a similar manner. A knowledge of these facts may enable one who happens to observe the appendix incidentally in the course of an operation, to take steps to obviate a subsequent danger by its removal when it shall appear greater than the average diameter. The average diameter of the human appendix is based on the examination of forty cases, irrespective of the presence in them or not of foreign matters, and it was found to be plus four-sixteenths of an inch. Of the forty cases there were twenty of each sex, and the average difference in the width of the appendices in the two sexes was, as before stated, one-tenth of an inch.

Thirty-nine instances were found in which the appendices were empty, and the measurements of each of these were given. In the male sex fifty-two per cent. were one-fourth of an inch in diameter, while in the female sex eighty-three per cent. were of this diameter. It is proper to say, however, that the entire number (39) is far too small a number upon which to base other than the following conclusions :

(1) That a greater number are empty, with a diameter of one-fourth of an inch, than are those of all other diameters combined. However, this is not strange, since the examples of the entire series having one-fourth inch diameter outnumber two to one those of other diameters, irrespective of the contents.



FIG. 5. ANTERIOR VIEW.—Showing large cecum, with appendix arising at inferior internal angle. Mesentery of appendix extends to its extremity.

(2) That those one-fourth of an inch diameter in the female sex are of proportionately much greater number (83 per cent.) than in the male. It is not strange that this disproportion should exist as to the empty appendix of the two sexes, since the appendices of the female are less liable to contain abnormal material than those of the male, as will be readily shown hereafter.

*Contents of the Appendix.*—One hundred and twenty-four of the entire series of cases (150) were examined with reference to



their contents. It is apparent at once that the importance of this phase of the subject cannot be considered to be secondary to any other, as the nature of the contents contribute largely to the ulcerative changes that lead to perforation of the appendix, and also to the gravity of the perforation itself. Of the 124 cases, eighty-two were of the male sex, thirty-four of the female sex, and in eighteen this distinctive item was not stated. Of the male series (82), fifty-eight (70 per cent.) contained abnormal matters of some kind, and twenty-four were entirely empty. Of the fifty-eight cases containing faecal, purulent and other matters, the



FIG. 6. ANTERIOR VIEW.—Showing rather large caecum with prominent muscular bands and appendix arising at nearly the middle of the extremity.

following statements will indicate the variety and also the percentage frequency of their presence: The presence of mucus in a greater or less amount was determined in fifteen instances (26 per cent.); mucus and faecal matter in five instances (about 10 per cent.); faecal matter alone in thirty, or nearly fifty-two per cent. of the cases. In several instances the faecal matter in these cases was hard, in one case approaching the size of a bean, in another somewhat smaller than this, but of equal consistency. Pus, faeces and mucus were present in one case, pus and faeces in one, pus

and fecus in two, gas and mucus in one, and pus alone in one. In the female series (34) fifteen, or nearly thirty-five per cent., were empty, while nineteen, or nearly fifty-six per cent., contained either mucus or faecal matter, and in some instances both. Seven, or about twenty per cent., contained mucus; twelve, or thirty-five per cent., contained faecal matter. Of the eighteen cases in which the sex was not indicated, eleven, or sixty-one per cent., were empty. The remaining seven cases of the eighteen showed that one contained mucus, five faecal matter, and one had undergone cystic degeneration at the extremity.



FIG. 7. ANTERIOR VIEW.—Showing cæcum forced forward and ilium entering from above. Appendix arises from interior lateral surface, posterior and a little below ilio-cæcal valve; it runs up parallel to ascending colon.

These figures illustrate the following important facts :

- (1) That sixty-seven per cent. of the entire series stated (124) contained abnormal material.
- (2) That abnormal material happens more frequently in the appendix of the male (70 per cent.) than of the female (56 per cent.).
- (3) That faecal matter, either soft or hard, is present more frequently in the vermiform, in both sexes, than any other class of matter, being noted in fifty-two per cent. of the male, and thirty-five per cent. of the female cases, and in twenty-eight per cent. of those in which the sex is not stated.

(4) That in no instance were there other than fecal substances, or products dependent on inflammation, present in these cases. Grape seeds and bodies foreign to the intestine were not found at all.

(5) That the presence of abnormal material in these cases (124) happened less frequently (67 per cent.) than is commonly ascribed to this condition.

Fitz, in his classical article "On Perforating Inflammation of the Vermiform Appendix," published in the *American Journal of Medical Sciences*, October, 1886, says: "In my own experience it is rather the rule than the exception for the appendix to contain moulded, more or less, inspissated feces." If a comparison be now made between Matterstock's list of 169 fatal cases of perforating appendicitis, in which fecal concretions were present in fifty-three per cent. and foreign bodies in twelve per cent., it will be seen that the aggregate percentage (65) of such well-marked agents as appeared in Matterstock's list, must indicate the presence of additional matters of a soft nature, as mucus, pus, soft feces, etc., which must have escaped appreciation in Matterstock's cases, owing to their intermingling with other disease products. The importance of the presence of inflammatory products in the appendix, in the absence of declared appendicular disease, is demonstrated by the results of Toft's post-mortem examinations, in which he found 110 instances of diseased appendix in 300 such examinations.

*Relation of Age to Contents of Appendix.*—The following tabulated statement plainly sets forth the association of these items in 102 cases, selected from the 150 already mentioned:

CONTENTS.	10 Years and under.	10 to 20 Years.	20 to 30 Years.	30 to 40 Years.	40 to 50 Years.	50 to 60 Years.	60 to 70 Years.	70 and Up- ward.	Totals.
Empty.	3	0	4	9	8	6	6	1	37
Feces.	1	3	6	11	10	6	0	0	37
Mucus.	1	0	1	4	4	4	2	1	17
Mucus and feces.			1	0	3	0	1		5
Mucus and pus.				1	0	0	0		1
Mucus and gas.					1	0	0		1
Pus.					1	0	0		1
Pus and feces.					0	1	0		1
Enterolith.					1	0	0		1
Mucus, feces and pus.							1		1
Total,	5	3	12	25	28	17	10	2	102

The percentage here (64) in 102 instances does not differ materially from the previous estimate (67), which was based on a little larger number of cases (124). In one instance the appendix of a six months' infant was found to be filled with soft faecal matter. According to the preceding table the preponderance of appendicular tenantry appears to be present between the ages of 30 and 50 years, and a slight increase in favor of the latter decade is noticeable. Fitz's deductions demonstrate the fact that appendicitis happens most often between the ages of 10 and 30 years (66 per cent.); the first decade (38 per cent.) in this instance being more fruitful of disaster than the latter (22 per cent.). According to the same author appendicitis occurred in but twenty-three per cent. of those between 30 and 50 years of age in the first decade, of which fifteen per cent. of the total percentage happened. I am unwilling to attempt a reconciliation of the difference in time between the earlier occurrence of appendicitis in Fitz's cases, and the preponderance of later abnormalities of the appendix, as shown by the table just quoted.

*Location, Direction and Extent of the Appendix.*—(See illustrations.) The consideration of the location, direction and extent of the appendix is next in importance to the presence in it of abnormal matters, and of their character. One hundred and forty-four cases of the series (150) were examined to determine the above stated items of arrangement of the appendix. The influence of sex in the arrangement was considered as based on eighty-six male and forty female illustrations. In eighteen of the 144 cases the sex was not stated, and, therefore, these cases will not be mentioned except in a general manner.

The following tabulated statement offers complete and prompt opportunities to note the frequency of arrangement in both a general and comparative sense:

Appendix Directed.	Male.	Female.	Not Stated.	Total.
Direction and extent of the appendix, as shown by autopsies of eighty-six male, forty female, and in eighteen cases in which sex is not stated.	20	11	3	34
Behind cæcum,	18	10	4	32
Downward and inward,	16	7	5	28
Into true pelvis,	14	3	4	21
Downward,	5	0	0	5
Upward and inward,	4	5	0	9
Upward and backward,	3	0	0	3
Upward and outward,	2	0	0	2
Outward,	1	1	0	2
Upward along inner side of colon to liver,	1	0	0	1
Upward outside of ascending colon and cæcum,	1	3	0	4
Curled below cæcum,	1	0	0	1
Downward and outward,	0	0	1	1
Upward and back of cæcum and colon,	0	0	1	1
Total,	86	40	18	144

*Appendix Directed Inward.*—It will be observed that the appendix is directed inward in plus twenty-four per cent. of the male, and plus twenty-seven per cent. of the female cases. If we now add to this expression of the position, "across the psoas, and toward the promontory of the sacrum," as is frequently done, the more exact extent and location of the appendix is defined. This modification aids in accounting for the nearer location to the median line of the body, in some cases, of the pain, tumor and tenderness of appendicitis, and also to associate more directly with this series of cases another series of 105 reported from the Russian (Turner) during the present year. Of the last series (105), twenty (19 per cent.) "extended transversely inward over the psoas and toward the promontory of the sacrum."

*Appendix Behind the Cæcum.*—It will be noticed that in the male series (86) the vermiform appendix was located behind the cæcum in the peritoneal cavity in a straight or curved manner eighteen times, or in about twenty per cent. of the cases; in the female series twenty times, or twenty-five per cent. of the cases; in the latter, or Russian series (105), it was located in a similar situation in about nine per cent. only. In the former series (145) it was, thus placed in a little over twenty-two per cent., irrespective of sex. It is thus shown that the appendix is located behind the cæcum in American residents more than twice as frequently as in the Russian. It would be interesting, indeed, to observe, if any such comparative relation exists, regarding the symptoms of appendicitis in these nationalities. It is fair to assume, I think, that the pain, tenderness and tumor resulting from a diseased appendix located behind the cæcum are modified in an appreciable degree by the presence of that gut above and in front of it. A full inspiration should cause less pain if the diseased appendix be located here, since the sheltering influence is less disturbed than when formed by the more movable parts of the intestinal tract. Tenderness and tumor are less marked in these cases, because the distended and overlying cæcum makes difficult the detection of the latter, and ameliorates the severity of the former, on palpation. The morbid processes in these instances are more easily circumscribed than if the diseased appendix be less well

enviored, or be free in the abdominal cavity. It was my fortune last summer to see, while in consultation with my friend Dr. McGuire, of this city, a case of appendicitis aptly illustrating the sheltering influence of the caecum. A full inspiration caused but little pain; the caecum was markedly distended; pressure revealed no tumor then, although the lapse of time, the symptoms, and abdominal manifestations indicated a circumscribed process. Still a few hours after, on subsidence of the caecal tympanitis, a firm, tender, circumscribed and deep-seated tumor could be easily outlined at the bottom of an area previously occupied by the over-distended caecum.

*Appendix Directed into True Pelvis.*—I esteem this position of the appendix as being one, if not the most important of the features of appendix location of the entire series. In eighty-six male cases the appendix entered the true pelvis in fourteen, or about fourteen per cent. of this series; in the forty female cases the pelvis was invaded in three instances, or in seven and a half per cent. It is apparent, therefore, that the male exhibits this peculiarity about twice as frequently as the female. This fact leads one to wonder whether or not the male sex suffers from pelvic appendicitis proportionately more frequently than the female. As the distance to which the appendix extended into the pelvis is not stated, it is not improbable that the difference in the lengths of this attachment in the sexes (4-10) may account for the greater number of pelvic extensions in the male sex. It should be noted that in the entire series (144), the appendix entered the true pelvis in about fourteen and a half per cent. of the cases, in one instance extending to midway between the base and apex of the sacrum. Strange to relate, in Turner's Russian series (105), before mentioned, fifty-one of the number are reported as extending into the pelvis. Of course, any accounting for this difference between the two races must be based largely on assumption, as it may be due to the fact that the appendix of the Russian is longer than that of the American. There appears to be some reason for this belief when it is considered that in the American series (144), the appendix was observed to run downward and inward toward the pelvis in twenty-eight instances, and to enter it

in twenty-one, making an aggregate of forty-nine, or a little over thirty-four per cent. of the cases. However, even now such a difference is present as to lead to the conclusion that the appendix of the Russian is longer, or that these observations cannot be relied upon in full. At all events, it would be interesting to know whether or not pelvic appendicitis is more common in Russia than in America, all other things being equal. It would be interesting, too, to be able to compute the relative frequency of pelvic involvement as compared to the other forms, in connection with the direction and extent of the vermiform in these respects. It is hardly necessary to direct attention to the salient clinical features of appendicular perforation within the pelvis. The pain, tenderness and tumor in these cases is nearer to the median line in front, and rectal examination often discloses the presence of heat, induration and abscess in the pelvis. Vesicular irritation, too, is a frequent concomitant. Here, surely, the gross anatomy has a close relationship to salient features of the clinical history.

It is rare, indeed, that the appendix can extend in either of the directions indicated in the tabulated statement without having a more or less close relation with the iliacus and psoas muscles, and the nervous cords so intimately connected with them, especially with the latter muscle. It naturally follows that the shorter the mesentery of the appendix the closer will be its relationship with the underlying tissue. Those appendices classed as "free" in the abdomen, are, therefore, farthest removable from these same structures. It sometimes happens that appendicitis is attended with pain in the thigh or testicles, due to direct or indirect involvement of the nerves supplying these parts. Flexion of the thigh often occurs early in the history of appendicular attacks, and the effort to extend the thigh is attended with pain in the pelvis, referable to the psoas or iliacus muscle. These muscles are often extensively, though infrequently, involved in the suppurative and destructive processes associated with an appendicitis. The pus incident thereto may point below Poupart's ligament, or, entering the pelvis, escape through the sacro-sciatic or obturator foramina. Now, one cannot speak consistently of all the rational clinical differences dependent on the anatomical relation of the



appendix, without danger of becoming verbose and tiresome, and it is not necessary, for the reason that this article is intended to be strongly suggestive and confirmatory, rather than assertive and encyclopædic.

I will not occupy further time with this line of thought than is essential to call your attention to instances of rare arrangement of the appendix. In three of the 144 cases it was entirely extra-peritoneal; in five of this series each appendix was so bound down and covered by old inflammatory products as to lead one to judge at first the appendix to be extra-peritoneal. Of the Turner series (105) two were entirely extra-peritoneal, and four partly so. It requires no argument at this time to convince one that the clinical history of extra-peritoneal appendicitis must differ in pointed respects from the intra-peritoneal variety. Suffice it to say in this connection that obscure cases, characterized by dull, nagging pain in the abdomen, attended with hectic, emaciation and other symptoms suggestive of obscure suppuration, and malignant disease even, sometimes present themselves, and it is only after the escape of pus through some unusual channel, or at some unanticipated point, that the true nature of the disease is suspected. It has happened, too, that a carefully conducted autopsy was necessary to establish the true cause of the trouble. Appendicitis with these exhibitions has been mistaken for abscess of the liver, Psoas abscess, Pott's disease of the spine, necrosis, obscure tuberculosis, malignant disease and perinephritis, to say nothing of many other examples of mistaken diagnosis. It seems to me not improbable that in the majority of these cases of appendicitis the appendix was located external of the peritoneum at the outset. In one of the three cases of the extra-peritoneal series, the appendix extended upward back of the cæcum and colon; in another it ran upward along the inner border of the colon to the liver. The clinical history of the diseased appendix when thus located, and the case of mistaking its true nature, can be readily conjectured.

*Mesenteric Attachments of the Appendix.*—(See illustrations). In sixty-six of 144 cases this feature of the arrangement was carefully noted; in twenty-six (40 per cent.) of the number (66), they

were characterized as "free" in that one-half or more of the length of the appendix was surrounded entirely by peritoneum. The remaining forty had mesenteries of various lengths, namely, four of about one inch in length; eight of less than three-fourths of an inch; and eighteen of above one inch in length.

The influence of a diseased appendix, when it is free in the abdominal cavity, on the clinical history and progress of the case, is often illustrated by the severity of the attacks, the rapid super-vention and extension of disease, and unfortunately, too, by the hurried demise of the patient in the absence of prompt surgical relief. According to my own observation, gangrenous appendicitis happens more frequently with the "free" arrangement of the appendix than with all of the other forms combined, and, too, the gangrenous manifestations have appeared at or beyond the outer limit of mesenteric attachment. The pathological venom of a freely movable diseased appendix is distributed over a greater area than that of a less freely movable one. The respiratory acts, the efforts of vomiting, and the vermicular movements of the contiguous intestines, contribute largely to this unfortunate result.

In conclusion, permit me to express the hope that you have not been unduly fatigued by this effort of mine to show through the foregoing illustrations, *first*, that abstract anatomy alone has little practical utility in medicine or surgery; *second*, that there is a very important relationship existing between the gross anatomy of the vermiform appendix and some features of the clinical history of appendicitis.

URETHRECTOMY, PARTIAL OR COMPLETE, AS A  
METHOD FOR RADICAL TREATMENT OF  
RUPTURE OF THE URETHRA,  
FISTULA, OR ORGANIC  
STRICTURE.<sup>1</sup>

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SURGEON TO THE HARLEM HOSPITAL.

IN the early part of the past summer my friend Dr. William Wile, of Danbury, Conn., related to me a method for the immediate and radical treatment of traumatic rupture of the deep urethra, which, for its *rationalité*, simplicity and immediate success, so much impressed me that I then and there determined that when the first opportunity offered I would put the same principles into practice on a pathological case that he did on one of a traumatic character; for, it seemed to me, that they were equally applicable and efficacious in both.

The citation of Wile's case was substantially thus: A middle-aged farmer, in one of the suburban towns of Danbury, Conn., one evening fell from a hay-loft, in his fall striking on his perineum, astride the sharp edge of a cart-wheel. This was followed by great distress in the perineum, and an incessant desire to urinate; but nothing, except, pure blood passed the meatus. Dr. Wile was called in consultation, early the following morning. At this time there was an enormous infiltration into the cellular tissues of the perineum, discoloration of the integument, and inability to introduce any sort of tube through the urethra, to empty the now, greatly-distended bladder.

On section of the perineum it was discovered that the deep urethra was completely torn in two, the distal end, being *in situ* while the proximal, had so far retracted into the loose, infiltrated tissues in the direction of the pubic arch, that it could not be found.

<sup>1</sup> Read before section of Genito-Urinary Surgery, New York Academy of Medicine, November 8, 1892.

Now Wile, not to be frustrated, made a supra-pubic incision, and passing a flexible catheter through the vesical urethra from within, soon brought the lost end into view.

He now sewed up the rent in the bladder and abdomen above, and closed the rent in the urethral canal by two courses, of fine catgut sutures; the tissues in the soft parts, being approximated with the same material. No constitutional disturbance followed; the incision in the perineum closing, by primary union, and no stenotic contraction, of the urinary passage at any time followed.

I reasoned, if we can safely resect segments of tubular structures in other parts of the body, notably those of the alimentary canal, why not the membranous urethra? At any rate, in all cases of traumatic rupture, or fistula, do a plastic operation, and restore the continuity of the canal. It occurred to me, also, that this procedure must have a place, in certain old, organic strictures, which resist gradual dilatation, and demand for their palliation an internal or external division of the dense calloused mass through which the pin-hole passage permits the urine to dribble away.

In my cogitations I naturally turned to the text books on surgery, and the authors on this special subject for information; but in this direction I was disappointed, for, exclusive of scattered cases of partial restoration of the urethra by autoplasmic flap-sliding, as recommended by Szymanowsky, I could find nothing, as there are no cases on record, in English or American publications, that I could find, of total resection of the entire calibre of the urethra for fistula; or even immediate restoration of the canal after traumatic rupture, by direct perineal incision.

In the meantime, in the month of June of this year (1892), two cases entered my service at the Harlem Hospital, having been sent in to me by physicians in the neighborhood for operation; which I regarded as appropriate to test my theories on.

*First Case: Urethral Fistula.*—J. C., aged 70 years. General condition bad. Much emaciated, and had a care-worn, melancholy expression. But we could find no evidence of organic disease. Locally he was in a pitiable state; as, immediately behind the bulb, in the deep urethra, there was a fistula as large as a crow's quill, through

which his urine continuously escaped, causing an extensive eczematous state of the scrotum, perineum and inner surfaces of the thighs as far down as the knees. His clothing covering the parts was continually saturated with foul-smelling urine. He had had this fistula, which was of blenorrhagic origin, since the summer of 1865, or a little more than twenty-seven years, during which time all his urine was drained through this new opening. Until six months before he came to us, he had perfect control of the bladder, but now incontinence was continuous; and the thick, ropy deposit on the bandages made it evident that the case was complicated with prostatic and vesical catarrh.

There were three strictures in the pendulous urethra. By a long and patient trial, twice repeated, I was enabled to pass a fine whalebone, filiform bougie through the urethra and the fistulous sinus, on to the bladder.

This, certainly, was not a very promising case for a novel surgical operation.

Having prepared the parts internally and externally, by a thorough disinfection, and after he had rested a week, an operation was undertaken for his relief, with a view of securing the continuity of the urethra by a total resection of the entire calloused segment of it.

Having been anæsthetized with ether, a filiform whalebone bougie was passed into the bladder and utilized as a guide.

As the dark outline of this could be seen through the aperture of the fistula it was not difficult to introduce a sharp-pointed, strong bistoury, and split it in the direction of the raphé, through the thick, calloused wall of the urethra, for about one centimeter, in the direction of the prostate, until the stricture was entirely freed in that direction. At this juncture the blade of the scalpel was withdrawn, and the distal wall of the urethra similarly treated.

The extent of cicatricial induration at the bulb was rather less than in the preceding, but of a denser composition.

All the circumjacent tissues were now stripped away from the perforated stricture, and it was, by a clean, transverse incision at either end, completely removed *en bloc*. So far there had been but very little hæmorrhage.

Now, looking into the hiatus made by the excised stricture, the proximal end of the urethra could be seen, retracted to within five or six millimetres of the deep perineal fascia. This incision here had gone through normal tissues. At the distal opening there was yet

evidence of remaining stenosis. But, fearing to sacrifice any more urethral tissue, after it was divided by a crucial incision, its interior cicatricial substance was cut away with a scissors curved on the flat. At this stage, the bougie was withdrawn, and a long, straight, probe-pointed scalpel passed in; and, from the aperture below, was carried forward until it appeared at the meatus in its transit, dividing those penile strictures on the floor of the urethra, and giving it a turn on its own axis, its withdrawal secured the free division of such stenotic patches as were lodged along the roof of the canal. Effective hæmostasis, with thorough irrigation, completed this stage of operation.

The next step was to secure, by an autoplasmic procedure, the reconstruction and continuity of the urethra. Having first ascertained that a number eighteen (English scale) steel sound could freely enter the bladder, without force, it was withdrawn; and with a No. 10 sound in the urethra, a circular seam of medium strong catgut interrupted sutures was made, bringing into immediate contact the separated, gaping edges, without tension.

In introducing the suture, the cellular and muscular layers only were included.

The peri-urethral, cellular, muscular and aponeurotic tissues were closed by a continuous line of catgut sutures separately. The edges of the skin were brought firmly together by twisted silk. No drainage was employed.

This completed the second stage of the operation. The next, the third, embraced the final flushing of the closed wound of the urethra and bladder, and application of the dressings.

A No. 10 hard-rubber sound was left in the urethra.

Had our man not had incontinence of urine I believe it would have been better to have catheterized intermittently, than to have established drainage; for, it is well known that the vesical mucous membrane will not tolerate with impunity any sort of foreign body over a considerable period of time without giving rise to suppuration, cystitis, urethral fever or other serious constitutional derangements.

In this case, while the wound in the perineum, with the exception of one small end, united by primary union, yet this man, while the catheter was in the bladder, presented such marked and persistent psychical disturbances that the question of sending him to an institution of lunacy was raised by his friends. All this time he had no fever, and as soon as the catheter was permanently withdrawn, and his

urine carried off intermittently, all those phenomena of mental derangement disappeared, as if by magic. The small pin-hole opening through the perineum was easily closed by denuding and suturing it.

Our patient was dismissed from the hospital September 15. At this time he had again recovered perfect control of his bladder, and urinated without pain or difficulty.

His urine is now of normal quantity, quality and specific gravity.

A No. 14 sound (English) passes in and out of the bladder, without difficulty. With a view of preventing an annular contraction at the point of suturing he has been advised to procure a set of bougies and pass one from time to time into the bladder, in the meantime employing the utmost caution in effecting perfect asepsis in his manipulations.

His general health has been entirely restored, and he has gained more than forty pounds in flesh since the operation.

*Second Case: Recurrent Organic Stricture.*—Patient, 48 years old, has had stricture for more than twenty years, and been treated by internal urethrotomy, divulsion and gradual dilatation, the primary pathological condition in each, after varying intervals, relapsing.

At time of entrance to hospital the urine was charged with mucus; frequently voided, particularly during the night, and always with pain. Was prepared to submit to any species of treatment which promised relief. His stricture, as the preceding, was of a gonorrhoeal origin. In this case, on the most thorough exploration, but one stricture could be discovered. This was so completely closed that nothing but the smallest-sized whalebone bougie could be passed through; and not even this until several protracted attempts were made.

The same preparatory line of treatment was instituted as in the preceding case; the whalebone also being utilized as a guide to cut on. First an incision running diagonally to the long axis of the body was made, through dense schirrous tissue, until the guide was reached, when a linear incision was made in either direction through the stricture, which was but little more than one centimetre in length.

When this was laid widely open it was freely tunneled out from below by cutting away a furrow through the calloused urethra, the convexity of which was above, with its base below.

A No. 12 catheter was now passed through and the entire passage flushed, after which it was removed and the urethra permitted to remain empty. The flow of the urethra was now reconstructed by approximating the peri-urethral tissues from below, the structures from within, out, being replaced by three rows of catgut sutures.

There was no reaction after operation. Patient's urine was drawn with catheter as often as appeared necessary. The local wound closed in by primary union, and within two weeks from time of operation it had solidly united, when a No. 14 sound easily entered the bladder without any difficulty, and he urinated with the greatest ease and comfort. He left the hospital on the 20th of August, and so far we have heard nothing from him: hence cannot vouch for the quality or permanence of result.

*Observations and Conclusions.*—It is almost needless to say that, for many obvious reasons, these operations were undertaken with some hesitancy and trepidation, as I have always believed that serious surgical operations should have something more to commend or justify their performance than their uniqueness or novelty, however skilfully performed. But, having carefully studied the anatomico-physiological qualities of the normal urethra, and considered just what constitutes the pathological foundation of all traumatic or organic strictures or fistulae, I could conceive of no serious objection to total resection of the entire calibre of the urethra with an immediate homologous urethrorraphy in old fistulae, or traumatic rupture; nor to external urethrotomy; partial, linear resection of the calloused mass, and *immediate reconstruction* of the urethral floor with the cellular tissues. It might be said that the membranous urethra, in its long, as well as in its lateral diameters, is lax, elastic and very distensible.

Dr. Otis was the first to demonstrate its enormous lateral distensile properties, thereby opening the way to successful lithotomy.

I am not acquainted with any author who has called attention to this property of elongation, possessed by that segment of the urethra wholly enveloped by the perineal muscles. It also may be added that the principles of this operation are precisely the same as those employed in the management of all organic strictures.

Through a certain course of pathological changes, generally consequent on gonorrhoea, the male urethral mucous membrane undergoes degenerative changes, resulting in a destruction of its epithelium layers and a fibrosis of its outerlying tissues.



That this is clearly understood is evident by the measures commonly instituted for the relief of a condition, which art is powerless to perfectly cure. We may widen a narrowed, strictured passage by immediate or gradual dilatation, split it with a blade from within or without; burn an opening through it by potash or electrolysis, yet, with all, complete retrogressive changes to the normal state, cannot be said to ever occur, though the immediate inconvenience which it occasions usually disappears.

It might be argued that a urethral floor composed of cellular elements will never assimilate to mucous membrane, and a contracted condition, must follow this operation, worse than that we have endeavored to relieve.

John Hunter, Baron Dupuytren, Laennec and Villumé long ago called attention to the close resemblance of the membrane investing a urinary fistula and a mucous one.<sup>1</sup> Cruveilhier and Chassier admit the possibility of the reproduction of mucous membranes after they have suffered loss of substance.<sup>2</sup> Andral claimed that in all these cases the reproduced mucous membrane was the result of transformation of the cellular elements.<sup>3</sup>

Dieffenbach, in his time, demonstrated by the Taliäcotian method, which has been recently revived, that he succeeded in curing a large number of perineal fistulæ of urethra; though in those days nothing was known of anæsthetics or antiseptics. Thus it appears that the fundamental objections cannot stand against this autoplasmic procedure in the surgery of the urethra.<sup>4</sup>

Happily, since the two cases here recorded were dismissed from the hospital I have read with much satisfaction Guyon's essay, which appeared in the *Gazette Hebdomadaire*, May 14, 1892, entitled, "Resection Partial of the Perineal Urethra, followed by Restoration, Entire and Complete."

It may not be amiss here to give the substance of his article, as it has a direct bearing on the subject under consideration, and is, in many particulars, a peculiarly unique production.

In the beginning, he says that partial resection of the urethra

<sup>1</sup> Treatise on the Blood. Leçons sur l'Anat.-Path.

<sup>2</sup> Essai sur l' Anat.-Path.

<sup>3</sup> Andral, Anat.-Path.

<sup>4</sup> John Swift's Translation. Dublin Jour. of Med. Sciences, Vol. X, p. 279.

has occupied a very moderate rank until very recently; that Roqués, one of his internes, has been able to collect but sixty-four cases from all sources. Forty-nine of these were complete, and fifteen incomplete. After describing the precise manual for operation, he tells us that Championnière treated a case of complete traumatic rupture of the urethra by perineal section and immediate approximation, with entire success. There were nine cases of lesions of the perineal urethra treated in his own wards; six by himself. In all these cases operation was resorted to only when the passage of instruments was quite impossible. Four were traumatic and two blenorrhagic. In two, there were fistulæ. In all, the entire calloused mass was removed and prompt union followed. Patients ages were from 14 years to 50. The youngest leaving the service could pass a No. 30 sound (French), and the adults from No. 50 to 60.

In no instance had there been any troublesome relapses, though he admits that he advised them to pass a sound on themselves from time to time.

RÉSUMÉ.—(a) It seems then, from the foregoing, that in all cases of traumatic rupture of the perineal urethra, the tissues should be laid open at as early a date as possible; and the continuity of the lumen of the urethra should be then entirely restored by a urethrorraphy.

(b) In those urethral, perineal fistulæ which resist dilatation or other tentative measures, regardless as to whether they are of a traumatic or blenorrhagic origin, they should be resected and continuity restored in the passage by homologous approximation of the separated edges, the hiatus remaining being obliterated, through linear elongation of the fibres of the muscular coat.

(c) With those strictures, rebellious to tentative methods, not appropriate for internal urethrotomy or divulsion, when they are divided by an external incision, the occasion should be utilized to hew a gutter through the cicatricial tissues, and to reconstruct the floor of the canal with the adjacent connective tissues.

(d) In all cases the most rigorous asepsis should be employed; and the aim, in every case, should be to secure non-suppurative, primary union.

REPORT OF SEVEN CASES OF ACUTE AXILLARY  
SUPPURATION OF UNUSUAL SEVERITY,  
TREATED BY EXTENSIVE EXCISION  
OF THE INFLAMED TISSUES.

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OF BOSTON,

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DURING the spring term of service of 1892 at the Boston City Hospital, seven cases of what might fitly be called malignant suppurative inflammation of the tissues of the axilla and its neighborhood were admitted into my wards within a period of three weeks.

These cases, with one exception, were of the same type, had the same clinical history and presented the same clinical picture. The one exception was that of the only female patient among them. She was syphilitic, and had had axillary swellings occasionally during the preceding year or two, which had subsided without suppuration. In her case the onset of this attack was more gradual, and she is included in this group only because the local condition discovered at the time of operation resembled that of the others, as did also the subsequent course of the case toward recovery. In the six other instances the previous history was with slight variations practically the same, and as follows: They were all well-developed men and in good health previous to this illness, which began suddenly with pain in the axilla, followed by swelling and more or less redness of the skin over the affected area, which symptoms increased rapidly in severity and were associated with very serious constitutional disturbance, great prostration being conspicuous in almost all, the inflammatory process extending in most cases very widely and quickly. Most of the patients came under observation within a few days from the beginning of the illness, and it was at once apparent that their cases differed materially from those of the ordinary examples of axillary abscess, in the extreme severity and wide

extent of the local process, and in the gravity of the constitutional conditions accompanying it. It was also found upon operation that the areolar tissue of the axilla and its neighborhood, as well as the axillary glands, were in every instance involved in the suppurative inflammatory process. In one case this tissue in the axilla and down the side to the eighth rib was occupied by numerous small foci of pus, so that it resembled a huge carbuncle.

Owing to the unusual character of these cases, and to the excellent recoveries of all of them after being subjected to the same method of operation, it seems worth while to report them.

In all of these cases the same method of operation was followed, differing only as to the position of counter-openings and in the extent of the operation, which varied according to the conditions found. The axilla was exposed by a long crescentic incision extending from the junction of the axilla with the arm, passing along the posterior margin of the axilla upward to a point corresponding to the middle of the outer border of the pectoralis major. From this line a large flap was turned up. When it was required, a vertical incision was carried downward onto the side from the middle of the first incision. In this way the axilla and part of the side were thoroughly exposed, all glandular and connective tissue that was suppurating, or threatening to do so, was then excised as far as it was possible to do so, the more remote parts of the abscess cavities were reached through counter-openings and curetted thoroughly, drainage tubes were inserted through these openings, and were removed at varying periods afterward according to circumstances, the edges of the wounds made to expose the axilla and the side were finally united, except at one point to allow of the passage of drainage tubes.

This method of operation differs from that commonly employed only in degree, it being more radical than that generally used, so far as I know. We were led to undertake the removal of these large masses of inflamed tissue in the hope of curtailing the process, it being evident that if they were left they would inevitably suppurate and subject the patient to such risks as were involved.

in a longer continuance of the process, which seemed at the time to be greater than those incurred by the thoroughness of the operation.

In all but one case the suppurative process was cut short, and the inflammation began to subside almost at once. In the one exception the inflammation extended down the arm to the elbow, after the operation, and pus had to be evacuated at that point a few days later. In the others there was not only no further extension of the inflammatory process, but it began very quickly to subside, and the general condition of the patients to improve.

There was comparatively little difficulty in thoroughly removing the masses of inflamed and suppurating glands from the axilla, but it was harder to dissect out the portions of the thickened areolar tissue which were suppurating, or seemingly on the point of doing so. There were no clearly defined limits to mark the extent to which suppuration in this tissue had gone, so that it was a question of individual judgment how much to take away and how much to leave. As would naturally be expected, hæmorrhage was rather profuse from the engorged capillaries of the inflamed tissues, but it could always be readily controlled by compression with wads of aseptic gauze and by dressings firmly applied after the operation. The wounds made to expose the axilla and, when needed, the side or arm, were sutured at the end of the operations, and, except in one case, united by first intention, except at the points that gave exit to the drainage tubes.

Some doubt was felt as to whether limitation of motion of the arm might not result from cicatricial contraction following such extensive removal of the tissues of the axilla and its neighborhood. Only two of the patients have reported since leaving the hospital; these were seen in November of this year (1892), nearly six months after their wounds had healed. Both of them stated that for a few weeks after they had left the hospital, they had some difficulty in raising the arm above the shoulder, but that this had gradually disappeared, and that for the last two months all the movements of the arm were as free as they had ever been.

The following is a brief summary of the principal clinical features of the individual cases :

CASE I.—A girl, aged 19 years, with a syphilitic history dating back three years. For two years she has had occasional painless axillary swellings, which subsided without suppurating. Three weeks ago she noticed a painful swelling in the left axilla : pain and swelling gradually increased. When she was admitted there was a swelling which entirely filled the axilla, and extended forward to the pectoral region beneath the pectoral muscle, pushing it and the breast of that side prominently forward. The skin of the axilla was moderately reddened. There was great prostration, loss of appetite, some nausea and vomiting, tongue heavily coated, temperature  $103^{\circ}$  F. The axillary swelling had a central area of fluctuation. Operation according to the method described. On exposing the axilla a large quantity of pus escaped. The abscess cavity extended upward beneath the pectoral muscle nearly to the clavicle, and outward to the middle of the upper third of the arm. A large mass of inflamed and suppurating axillary glands and connective tissue was dissected out from the axilla, leaving healthy tissue beneath, and the abscess cavity beyond this region was thoroughly curetted and vigorously swabbed out with wads of sterilized gauze soaked in corrosive sublimate solution, drainage tubes inserted, and the wound sutured, except for the space required for the exit of the drainage tubes.

There was but very slight discharge of pus after the operation, the patient's general condition improved rapidly, the wound healed by first intention except at the point left open for the passage of the tubes, which were gradually withdrawn and finally removed at the end of ten days. In three weeks healing was complete, and the patient was discharged well at the end of one month after operation.

CASE II.—Male, aged 30. Until one week before admission the patient was perfectly well. At that time a painful swelling appeared in the right axilla, rapidly increased in size, and on the fourth day had extended half way down the upper arm, and forward to the pectoral region. The patient suffered great pain : the skin of the axilla and arm was reddened. Severe constitutional disturbance common to all these cases was present at the time he entered the hospital.

Operation as before. A large quantity of pus escaped on expos-

ing the axilla. The incision in this case was prolonged to nearly the middle of the upper arm. The abscess cavity extended from the middle of the upper arm through the axilla, forward to about midway on the clavicle beneath the pectoral muscle, and backward to the outer border of the scapula, at which point a counter opening was made. A large mass of inflamed and suppurating axillary glands, as well as a considerable quantity of infiltrated connective tissue along the arm and from the axilla, were dissected out, leaving a clean, healthy surface beneath. The abscess cavity beyond the parts exposed by the excision was treated as in the first case, drainage tubes inserted, and the wound sutured. The wound united, as in the first case, and the patient was discharged well in three weeks and a half. Suppuration ceased entirely within three or four days, and the patient's general condition improved almost at once after the operation.

CASE III.—Male, aged 23. In excellent health until four days ago, when without any apparent exciting cause a painful swelling appeared in the left axilla. The inflammatory process extended with great rapidity, accompanied by grave constitutional disturbance. When admitted the patient was very seriously ill. The inflammatory process occupied the axillary and pectoral regions, and was beginning to extend down the side and out onto the upper arm.

At the operation, which was done on the sixth day, suppuration was found to have extended from its starting point in the axilla upward beneath the pectoral muscle to the clavicle (about midway in its course), backward to the scapula about half way down its outer border, outward to the upper third of the arm, and down the side to the eighth rib. The axillary glands were found to be in various stages of suppuration, as was the areolar tissue in this region and along the side. Treatment as in the last case. Counter openings beneath clavicle, midway on the outer border of the scapula and opposite the eighth rib on the side.

The patient did not improve during the first three days after the operation, and remained in a precarious condition. On the fourth day the inflammatory process was seen to have extended down the arm to the elbow joint. Another counter opening was made at this point, and the new abscess cavity along the arm treated as usual, and on the following day there was marked improvement in the patient's condition. He was discharged well at the end of five weeks.

CASE IV.—Male, aged 29. A man of powerful muscular devel-

opment, in perfect health until eight days ago, when he noticed a painful swelling in the right axilla. The pain and swelling rapidly extended down the side and out toward the arm. When admitted the constitutional disturbance was very severe: the axillary and pectoral regions were very tender to the touch: there was a large hard swelling filling the axilla: a diffused hard swelling occupied the side as far down as the sixth rib: the skin covering this area and the axilla was moderately reddened and infiltrated.

On exposing the axilla and also the side by an additional incision, but little free pus escaped: the areolar tissue of the axilla inside was seen to be greatly thickened and occupied throughout by numerous small foci of pus, presenting the appearance of an enormous carbuncle (the skin was not involved in this process). In addition, there was a large mass of axillary glands in various stages of suppuration. These affected tissues were excised as thoroughly as possible, and the case treated otherwise like the preceding ones. This was the most difficult operation in the series, and the most extensive, as the limits of the pathological process were ill-defined, and the infiltrated areolar tissue was so dense and so adherent to the underlying tissues that its removal was very slow and tedious. Less shock followed the operation than might have been expected. There was, however, no improvement in the patient's general condition for four or five days, but the local condition began to improve almost immediately, and was, after the first week, followed by rapid gain on the part of the patient. The wound in this case did not unite, but gaped in places, and healing by granulation occupied nearly two months, at the end of which time the patient was discharged well.

CASE V.—Male, aged 30: in excellent health until five days before admission. Five days previously he noticed a hard painful swelling in the left axilla: this increased steadily in size, but not so rapidly as in most cases, and when operated upon it had not extended to the side nor to the arm. There was also less constitutional disturbance than usual in this case.

On exposing the axilla a large quantity of pus escaped. The abscess cavity extended to the pectoral region in front, and to the scapula behind, as in the other cases. The axillary glands and areolar tissue were inflamed and suppurating. The operation was conducted as usual: the wound united as in other cases: there was almost no discharge of pus subsequent to the operation. The patient



was discharged with the wound entirely healed and in excellent general condition at the end of three weeks.

CASE VI.—Male, aged 30: in good health until two weeks ago. He then noticed a painful swelling in the right axilla, which soon extended to the pectoral region, and at the end of ten days began to involve the arm. Severe constitutional disturbance accompanied the process. When admitted, the patient's condition was very grave. The right pectoral region projected prominently, and was very tender to the touch. The axilla was occupied by a fluctuating swelling as large as two fists.

On exposing the axilla a very large quantity of pus escaped. The glandular and areolar tissues of the axilla were in the same condition as in the other cases, and were treated as usual. Suppuration had involved the pectoral region more extensively than in any of the other cases. For this reason a free counter opening was made beneath the clavicle near the border of the sternum, to give better access to the abscess cavity during the operation, and to provide for drainage subsequently. Convalescence was uninterrupted. The patient was discharged well at the end of four weeks. Suppuration ceased almost immediately after the operation in this case also.

CASE VII.—Male, aged 46: in good health until ten days ago. From that time the same history as in the preceding case. The local and general symptoms almost identical with it, except that the extension of the process had been more rapid and had involved the upper arm. The same condition was found on operating. The usual method was employed. A counter opening was made in the lower third of the arm. Marked shock followed operation in this case, but the patient soon rallied, rapidly improved, and was discharged well at the end of five weeks and a half. Very little pus was discharged after the operation.

The absence of shock in most of the cases after the operation was noticeable; the condition of the patients was very carefully watched during the operations, which would have been suspended if at any time it seemed necessary.

It is difficult to convey the impression made by these cases, or to show that they differed from the ordinary cases of abscess of the axilla such as may occur, for example, in the course of a lymphangitis of the arm which has originated in a wound of the

hand. The writer can only add that, having seen during the past ten years a very considerable number of examples of various forms of axillary suppuration, these cases appeared to him as entirely distinct from any he had ever encountered; the distinction lying chiefly, as had been said, in the virulence of the local process, in the severity of the constitutional symptoms accompanying it, and in the extensive involvement of the connective tissue in the neighborhood of the axilla in addition to that of the axillary glands.

# TRANSACTIONS OF THE NEW YORK SURGICAL SOCIETY.

*Stated Meeting, December 14, 1892.*

The President, ARPAD G. GERSTER, M.D., in the Chair.

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## GROUP OF CASES OF APPENDICITIS.

Dr. CHARLES K. BRIDGON presented the following cases of appendicitis which had been recently under his care in the Presbyterian Hospital at the same time, and which illustrated different phases of the disease :

CASE I.—Nelson Lemieux, aged twelve years, was admitted to the Presbyterian Hospital on August 29, 1892. Three days previous to admission he noticed a pain in the right iliac region, which was increasing in intensity. A small tumor also appeared. On admission, temperature  $102^{\circ}$  ; pulse, 104 ; respiration, 34 ; by palpation a moderately large swelling in right iliac region was found ; it was slightly painful.

*Operation.*—An incision about three inches in length was made over the tumor. On incising the abdominal wall an abscess cavity was opened, from which flowed about six ounces of foul-smelling pus. The cavity was cleaned and packed loosely with iodoform gauze. Antiseptic dressing. Uninterrupted recovery. Discharged cured September 27, 1892.

CASE II.—Stephen Clark, aged thirty-seven years, was admitted September 25, 1892. General health of patient good, and no history of previous attacks. One week ago patient suffered from some abdominal uneasiness ; no positive pain ; constipation of bowels. Continued at work, however, until two days ago, when he took to bed, with severe pain in right iliac region, vomited several times and felt feverish. Next day, condition being somewhat worse and the pain becoming more localized, he was brought to the hospital by the ambulance. On admission patient was in some shock ; temperature,  $98^{\circ}$  ; just before operation temperature,  $102^{\circ}$  ; pulse, 102, soft and rapid ; respiration, 34.

*Operation.*—Usual incision. On opening abdomen considerable pus welled up from the general cavity of the peritonæum. Appendix was found and after considerable trouble tied off and removed. All pus in the immediate neighborhood of the appendix was sponged up. No attempt was made to clean the general cavity, and the wound was hurriedly packed with iodoform gauze, as the patient's pulse ran up to 150, and his condition became very bad. He was stimulated during the night. At 8 A.M. next morning his pulse was 124; respiration, 36; bowels moved; temperature rose to 102° in afternoon, but gradually fell after that. Dressed on sixth day. Wound fairly clean. Patient recovered strength gradually. Discharged cured at end of seven weeks.

CASE III.—Thomas Manix, aged twenty-three years, was admitted October 5, 1892. Patient's previous health was good except some previous palpitation of heart. Patient an inveterate cigarette smoker. Three years ago patient awoke with some abdominal distress. His bowels moved as usual, but he began to have pain, which became gradually localized in the right side. Condition becoming worse he was brought to the hospital by the ambulance. On admission temperature 103.6°; pulse, 124; respiration, 34. Patient had vomited several times during the day. Pain pretty severe in the right iliac fossa. Pulse intermittent at about every sixth beat.

*Operation.*—Incision over point of greatest tenderness, extra-peritoneally some oedema of tissues found; some lymph extravasation on incising peritonæum. Appendix was found and ligated close to caput coli. The wound was packed with iodoform gauze. Uninterrupted recovery. Discharged cured at end of six weeks.

CASE IV.—Henry Beyer, aged eighteen years, was admitted November 5, 1892. Eight days ago patient awoke at 2 A.M. with sharp pain in the right side, but went to work and worked three days, then went to bed; pain more severe; constipation marked. Brought to hospital by the ambulance. On admission temperature, 103.4°; pulse, 112; respiration, 28. Taken to operating room.

*Operation.*—Four-inch incision was made along the outer border of the rectus muscle; the appendix was found lying to the left of a small purulent collection, from which it was separated and removed; the cavity was packed with iodoform gauze and a few stitches taken in the wound. Uninterrupted recovery.

CASE V.—David Adam, aged twenty-two, admitted November 5,

1892. Patient has had several attacks of severe abdominal pain in the right side, lasting two or three days, first attack being about a year ago. Seven days ago had pain in right side, increasing in intensity. Vomiting began next day; had two chills. During next five days patient suffered from diarrhoea. Temperature said to have risen to  $105^{\circ}$ , pulse, 106, respiration, 24.

*Operation.*—Incision was made five inches in length along the outer border of the rectus, some serous infiltration of transversalis fascia, no adhesions along the line of the incision, but some very frail ones found behind the rectus. On drawing abdominal wound apart, some undoubtedly sero-purulent fluid was found to flow downward from above; a small mass was found by the side of the caput coli, and on separating the adhesions that led to it a cavity was opened containing about half an ounce of thick, creamy pus, entirely different from that which was noted as coming from the general cavity of the peritonæum. This cavity was lined with perfectly smooth, resistant walls, and on farther examination it was found that the middle third of the appendix was united to it by what were evidently old adhesions; these were separated with some difficulty, and the appendix was ligated and removed at its junction with the gut. The wound was left entirely open, a large drain was placed over the stump, another at the upper angle of the wound, a large iodoform tampon between the two, and a voluminous top dressing of iodoform and bichloride gauze above. Regular dressings and uninterrupted recovery. At end of third week the wound edges were raised and trimmed and brought together by a few sutures; sinus packed.

CASE VI.—Occurred two days before the report, and it is doubtful if it should be included in the series, but as evidence of the fact that the diagnosis is sometimes surrounded with difficulty it is inserted here. The specimen removed would appear to warrant the conclusion that there was an error in diagnosis, and yet the history establishes the conviction that only an exploration could clear it up. Out of quite a large number of cases treated by the speaker it is the first in which section has disproved the correctness of the diagnosis.

The patient, a woman twenty-seven years old, was brought into the hospital December 8, and was reported to be suffering from appendicitis; she miscarried two years ago; a portion of the ovum had to be removed with instruments, and she was confined to her bed for three weeks; since then she has had six attacks of pain located with much precision in the neighborhood of the appendix; the present

attack began ten days before admission with sudden sharp pain, constipation, vomiting and collapse.

December 10 pain had abated somewhat, but there was considerable sensitiveness at McBarney's point, and it was thought that an obscure tumor could be felt there. The history of the case, however, led the operator to think that the trouble had originated in the pelvis after the abortion two years ago. Section was made on the 12th, and the appendix removed was found apparently healthy, but contained a few thread worms: the ascending colon was normal, nothing could be found in the gall bladder in the course of the ureter or in the pelvis, and we are at a loss to know what caused the attacks, which certainly appeared to warrant an exploration.

Case 1 was a simple abscess which had its origin in the appendix but which was effectually shut off from the general cavity: case 2 was apparently one of diffuse suppuration but moderate in character: in case 3 there were the usual conservative processes but no pus that could be recognized by the naked eye: case 4 had an abscess cavity bounded by adherent omentum, appendix and intestine: and in case 5 there had evidently been several attacks; there was an old, thick-walled, small abscess, plus a small sero-purulent exudate that was not encysted.

Dr. JOSEPH D. BRYANT read the paper of the evening, entitled *The Relations of the Gross Anatomy of the Vermiform Appendix to Some Features of the Clinical History of Appendicitis*. See page 164.

#### DISCUSSION.

Dr. JOHN A. WYETH thought Dr. Bryant's interesting anatomical dissertation went to emphasize what clinical experience had taught us, namely, that one could not say before opening the abdomen for appendicitis just what he would find. There were so many directions in which the appendix might point, and so many complications arising in different cases, that one could form but a very indefinite idea of what he would find when he started to search for it. As Dr. Bryant's paper, and the series of cases of appendicitis presented by Dr. Briddon were to be discussed together, he wished to add a case illustrating a class which Dr. Briddon's series had not included, *i. e.*, rapid gangrene and perforation of the appendix, with pouring out of liquid contents, and consequent general peritonitis developing with extreme rapidity. In such cases there was seemingly no time for

encapsulation of the inflammatory process before it had become general. Fortunately such cases were rare, but when they did occur they proceeded with lightning speed to a fatal termination; nothing could save them except an immediate operation. He had met with such a case the previous week, had operated, and his patient was then convalescent. She was twenty years of age, and had been in robust health until Friday night, when she felt a slight pain in the region of the vermiform appendix. On Saturday there was no fever, no alarming symptoms, and the physician with whose family she lived, although watching her case closely, did not think it necessary to call a surgeon. On Sunday night her temperature arose, there was rather marked tenderness over the appendix, which soon became general. The doctor became alarmed and Dr. Wyeth and Dr. Weir saw her. Both made out rapidly extending peritonitis from perforation. Dr. Wyeth operated and found, as soon as he cut through the walls, the abdominal cavity full of milky pus, which welled out of the opening and emitted an offensive fecal odor. There was a general peritonitis, and it was evident that the foul pus, containing feces, had come in contact with every portion of the peritonæum. Examination showed perforation of the vermiform appendix at a gangrenous point close to its caecal origin and rapid escape of liquid feces. There had been scarcely any attempt at encapsulation about the appendix. Plenty of iodoform gauze was introduced to protect the surrounding parts while the appendix was being lifted up, ligated and removed. A rubber drainage tube was introduced down to Douglas' pouch and the abdomen was flooded three separate times with Thiersch's solution, aided by sponging. Finally a tube was introduced, walled about by iodoform gauze, and this was washed out three hours afterward. Finding that it had already become occluded by adhesions it was withdrawn. Soon after the operation the temperature had fallen to 99°, the pulse to 110, there was no tympanitis, apparently no peritonitis; later the bowels moved twice freely, and to his surprise at this date, the eighth day, it would seem the patient was going to recover.<sup>1</sup>

This form of appendicular disease demanded early positive diagnosis and surgical interference.

Dr. KAMMERER showed a vermiform appendix which he had extirpated six months before, the history of his patient simulating an

<sup>1</sup> On the ninth day the fecal fistula broke into the general cavity of the peritonæum, and the patient went rapidly into collapse and died fifteen hours later.—W.

acute perforation. A healthy young woman of twenty-five years had had several attacks of appendicitis during the past months; in fact, had never fully recovered during this period. The attacks had been severe, the patient being in bed for many weeks at a time, with high fever and much pain over McBurney's point. After the last attack she had been up and about the hospital in her capacity as nurse for a few weeks, but a steady rise of temperature in the evening to about  $101^{\circ}$  and constant pain at the classical point had necessitated putting her to bed again. An operation had been strongly recommended, but was refused by the patient. Her condition remained unchanged for a week or so, when he was called to the hospital early one morning, a sudden change having taken place in the condition of the patient. She had had more pain during the night, the increase being sudden, and the temperature had gone up to  $105^{\circ}$  toward morning. When he saw her the temperature was  $104.5^{\circ}$ , her pulse 160 and very weak, and there was some tympanitis. The patient's extremities were cool and she gave the impression of one in moderate collapse. The diagnosis of acute perforation was made and laparotomy immediately done. Upon opening the abdomen nothing abnormal was found. The peritonæal covering of the intestines was everywhere pale; there was no injection, and there were no adhesions. Moderate tympanitis somewhat hindered the search for the appendix, but when the latter was found it was seen to be about four inches long, absolutely rigid and projecting into the pelvis in a straight direction. It was completely filled with fecal concretions. It was ligated at its base and cut away, and the abdominal cavity was entirely closed. The patient made an uneventful recovery, and has not had a single attack since the operation (now half a year ago) nor any rise of temperature, showing conclusively that the appendix was responsible for her condition upon operation, if not for the extreme collapse immediately preceding it. The case seemed to be another illustration of the difficulty of early diagnosis of perforation, though, no doubt, the reverse: a lack of early symptoms in undoubted perforation was more frequently the case.

Dr. LEWIS S. PILCHER related a recent experience in farther illustration of the protean nature of this subject. The patient was twelve years of age, previously in apparent perfect health until seized suddenly with the symptoms of perforation of the appendix and commencing general peritonitis. Dr. Pilcher saw her a few hours later, when collapse was so marked that he deemed interference not then in place. After a



few hours' stimulation her condition had so far improved that he thought it proper to undertake laparotomy for the supposed perforative appendicitis. To his surprise the appendix was found healthy, although abundant sero-pus flowed from the peritoneal cavity, the original cause of the peritonitis giving rise to it not being apparent. The cavity was cleansed and provision made for drainage, but peritonitis progressed, and the patient died sixty hours after the operation. An autopsy was carefully made, but the original source of the infection could not be discovered. The appendix was healthy. There was no evidence of uterine, bladder, tubal or ovarian trouble: no perforation of the intestine. There were multiple foci of accumulated pus in different parts of the peritoneal cavity and general peritonitis. The symptoms had been those which usually accompany perforating appendicitis and rapidly spreading general peritonitis.

Dr. A. G. GERSTER related a case which he saw last summer of fatal gangrenous appendicitis, the patient having evidently died of septicæmia of the most virulent character. There was no tumor present and the local pain and a deep-going general intoxication were the leading features. On laparotomy, no perforation was found and the appendix was encapsulated, not free in the peritoneal cavity. There were a few drops, and only a few, of thick pus which, with the totally necrotic, but whole and imperforated appendix were encapsulated by surrounding coils of intestine and lymph exudate. While there had been strictly local pain, the fever, somnolency and dejection, dryness of the tongue, tendency to vomit and other symptoms of the severity of grave septic intoxication were marked from the beginning. The infectious and inflammatory process was found so narrowly limited, while the general peritonæum appeared perfectly healthy, that Dr. Gerster firmly hoped the patient would recover, but his hopes were not verified. The high temperature and somnolent state continued, but without symptoms of peritonitis: indeed, at no time was there a general peritonitis. The case was one of interest from the fact that there was no evidence of perforation, no escape of the contents of the appendix nor of pus into the general abdominal cavity, yet there was from the first evidence of severe septicæmia, to which the patient succumbed.

Dr. PARKER SYMS referred to a case in which during oöphorectomy the vermiform appendix came into view and, although healthy, was removed because of its great length (over five inches) lest it should cause future trouble. The point of special interest connected

with it was that after its removal it continued for about ten minutes to squirm and turn on the plate very much as a grubworm might do, and finally a formed fecal movement took place from it.

Dr. WYETH inquired whether any of the members had known abscess of the liver follow appendicitis.

Dr. LANGE replied that he had seen one such case. The autopsy revealed thrombosis and a metastatic abscess of the liver. Not long ago he had operated in a pyæmic case and expected to find abscess of the liver, but was mistaken. There was sub-diaphragmatic suppuration of moderate extent and in connection with a sinus in the lumbar region, and a somewhat enlarged and fatty liver, but no suppuration in this organ. This was also verified at autopsy.

Dr. HERMAN M. BIGGS, being invited to speak, said he had found in those cases of rapidly fatal general peritonitis following perforative appendicitis that the appendix invariably had extended freely into the abdominal cavity. In such cases the autopsy had showed also that there had seldom been any considerable attempt to circumscribe the process. He believed the anatomical position of the appendix had a very important bearing upon the tendency of the disease. It was much more common clinically for the cases in which the inflammatory process did not extend to be situated behind or on the outside of the cæcum. In the larger proportion of cases the appendix extended freely inward, not behind the cæcum; but when it was in the latter position hardened fecal masses were more likely to form in the appendix, and were less readily discharged by its peristaltic movements, as the mesentery was usually shorter and the organ was less movable. Hence the *larger* proportion of cases of disease were in the appendix when it was back or outside of the cæcum, although the organ was situated here in a *small* proportion of cases. The appendix was especially liable to disease when fecal matter gained entrance to the distal end. This formed an angle with the proximal end, and a short mesentery held it in position. Such cases formed the majority of those in which ulceration took place.

In reply to the question of Dr. Wyeth, he said he had seen abscess of the liver follow ulceration of the appendix. In one of the cases of hepatic abscess which had come under his observation there had been ulceration nowhere except in the appendix. In another case of hepatic abscess there were one or two ulcers in the cæcum only.

Dr. BRYANT could recall three cases of suppuration following

appendicitis, in which the tumor had been located from the first between the lower ribs and anterior superior spinous process of the ilium of the right side. In these cases the incision for the relief of the patient was made above the crest of the ilium. It was a fair inference that in such cases the appendix extended in that direction, being located probably outside of the meso-colon. Dr. Bryant recalled another case in which severe pain extended down the cord even to the testis itself, which was markedly retracted, simulating in these respects the passage of a renal calculus. He believed these phenomena to be due, directly or indirectly, to the involvement of the genito-crural nerve by the appendicular inflammation, arising, of course, through its relations to the psoas muscle. Regarding the interesting case of Dr. Briddon, in which no evidences of disease were found, Dr. Bryant thought it probable that the pain at the seat of the appendix, which was thought by Dr. Briddon to demand operative interference, was due to the efforts of the appendix to rid itself of the parasites that were contained in it. At any rate that seemed to be a reasonable hypothesis in the light of Dr. Sym's observation of the vermiform appendix, to which he had just alluded. Dr. Bryant believed that he had, on two occasions at least, witnessed a severe attack of pain in this region due to the efforts of the appendix to rid itself of objectionable contents.

Dr. HERMAN MYNTER, of Buffalo, by invitation, said that up to three months ago it had been his good fortune not to have a fatal case of appendicitis after operation, although he had operated many times. He then met with two fatal cases in which there was gangrene and perforation and rapid general peritonitis. That condition was present which was mentioned by Dr. Biggs—the mesentery not extending to the end of the appendix causing it to bend upon itself. Neither patient had been sick over forty-eight hours before he operated: in both he found gangrene of the outer half of the appendix with perforation. Death soon followed. He had operated in two cases of appendical abscess located behind the cæcum, entering the abscess from behind. In diagnosis the condition of the pulse was of much significance when one was about to be misled by the low grade of temperature. If the temperature were  $99^{\circ}$  to  $100^{\circ}$  F. and the pulse 140 or 150, one might rest assured that in nine cases out of ten there was peritonitis from gangrene. This was particularly true if the breathing were costal, not abdominal. The pulse was of importance also when the question arose as to the necessity of operating immediately or of waiting twenty-four hours.

## CHOLELITHOTOMY.

Dr. BRIDGON presented a woman, aged forty years, who was admitted to the hospital October 4, 1892. Her present trouble began about six weeks before her admission to the hospital with pain in the right side, particularly referred to right kidney region. She had chills, fever and vomiting for about a day. Urine high-colored and scanty. The sharp darting pains soon passed away and the patient was able to be up in about a week. There was no jaundice. She had not been well since. She was conscious of some swelling in the abdomen for the past two or three weeks, and she was kicked in the right side of the abdomen about two days ago. On admission her temperature was 100°; pulse, 88; respiration, 22. In right lumbar region can be felt an indistinct mass, somewhat larger than a fist, apparently extending into right hypochondriac region; the tumor was regarded as renal. The patient remained under observation for about ten days, and an exploratory incision was deemed advisable.

*Operation.*—An incision five inches long was made along the outer border of the erector spinæ. The kidney was easily exposed and found to be perfectly healthy, and in front of it could be felt a solid nodular mass which was at first believed to be a carcinomatous colon, but in a few moments that viscus came into view in the wound empty and unchanged in structure. The patient was then placed supine, and an incision of five inches was made along the outer border of the rectus, commencing above at about the ninth rib. On opening the peritonæum the right lobe of the liver was found extending about two inches below the margin of the ribs; there was found no gall bladder and no fissure to represent its position. Drawing the liver well up and depressing the stomach the gastro-hepatic omentum came into view, and the index finger introduced behind its right border came in contact with a hard mass that could be palpated between the finger and thumb, but which was so fixed at a depth of about three inches, as to make it impossible to draw it to the surface; the layers covering this were carefully separated until a small cavity was opened which would just admit the finger, and which gave exit to a drachm or two of mucus and contained two calculi, one as large as a marble, the other of smaller dimensions. In the absence of demonstrable evidence of the existence of a gall bladder and the existence of the mass apparently in or behind the right border of the omentum, it was concluded that this must have been a dilated common duct; after removal of the

calculi and thorough cleaning, a tampon was introduced into the cavity and the abdominal wound left open. The resulting biliary fistula required frequent dressing, and the discharge from it was profuse for several weeks. It grew gradually less in amount, until at present there is but a small wound about an inch in depth, and apparently no bile has been discharged for a couple of weeks. There remains a small wound where the tube was removed from the kidney wound. Patient enjoys excellent health, is about in the wards all day and able to assist in light work. Whether the conclusions arrived at by the operator as to the cavity being a dilated common duct may be open to question, but quite a number of cases of congenital absence of the gall bladder are on record, and there are also cases reported in which there were two common ducts in the same subject.

Dr. LANGE remarked, regarding Dr. Briddon's case, that he had himself operated upon two patients in whom the symptoms due to an affection of the gall bladder or ducts had simulated enlargement of the kidney, and in one instance he first cut down upon the kidney in the lumbar region, but finding it normal he then incised anteriorly and found stones in the dilated gall bladder. In his experience the operations during which the gall bladder was found to have been the seat of suppuration and cicatrization were among the most difficult in the domain of surgery.

Dr. GERSTER had had an opportunity last summer to observe in the same patient a floating kidney and an enlarged gall bladder. After making an incision in the lumbar region, he fixed the floating kidney by suture, then opened the abdomen anteriorly, incised the gall bladder and took out a large number of stones from the cystic duct. The woman recovered.

#### THYROIDECTOMY.

Dr. BRIDDON then presented a woman, aged thirty-five years, admitted to Hospital November 15, 1892, who first noticed a swelling on both sides of the neck when she was about fourteen years old, but it caused her no inconvenience until the past two months. It has been growing slowly but rather faster in the past few years, and increased more rapidly with each of her nine pregnancies. Tumor impedes respiration and deglutition somewhat. Patient is well nourished though somewhat anæmic. On admission temperature, pulse and respiration were normal; venous hum quite marked over the great vessels of the neck; mitral systolic murmur.

The tumor involved principally the right side of the neck, the larger mass being somewhat quadrilateral in form, measuring about four inches in its transverse and three in its vertical diameter; this portion had two large-sized nodes in its substance; in the middle line was a smaller mass about two inches in diameter containing one node. The left lobe was slightly hypertrophied, but contained no node: the surface of the neck was marked by large superficial veins.

It was determined to remove the tumor on the right side and to leave the smaller left lobe, which was apparently healthy.

*Operation.*—Ether and subsequently chloroform narcosis. A long incision was made along the anterior border of the right sternomastoid muscle from near the mastoid process to the sterno-clavicular articulation. Division of the platysma exposed a large congery of veins. They were not round and full, but compressed between the muscular covering and the tumor. They were flattened out into tape-like processes, anastomosing in every direction. After ligation of the main feeders the further dissection was comparatively easy. The subhyoid muscles were expanded into broad layers, the division of which exposed the capsule, which was treated with proper respect, and outside of this the mass was enucleated by blunt dissection. The superior thyroid was exposed and divided between two ligatures, then the isthmus, which was only slightly enlarged, was separated from the front of the trachea and similarly treated. Outside of this the separation of the main tumor from the right side of the trachea was difficult, the attachment was very intimate, a process from it wrapped round behind the trachea, which was compressed laterally so that the transverse diameter of its lumen certainly could not have been more than one-third of an inch. The tumor was then lifted out, the inferior thyroid was cleared, its relation with the recurrent nerve noted, and it was divided between two ligatures. After securing what veins had been opened, a drain was placed in the lower angle and the wound was closed with chromicized gut.

Patient reacted well. At midnight a slight secondary hæmorrhage required the removal of some sutures and the ligation of a vein in the upper angle of the wound. Since that time recovery has been uninterrupted, and she is now ready to be discharged from the hospital.

The pathologist, Dr. Thacher, reported that "Microscopical examination shows ordinary thyroid tissue, except that the alveoli vary greatly in size. Diagnosis: hyperplasia of thyroid."

## ULCERATING GUMMA OF THE KNEE.

Dr. FRED. LANGE presented a woman, aged fifty-one years, who married at the age of twenty-five, had since borne nine living children, had had one still-born child, the first, and several miscarriages. For years she had had an ulcer of the right leg which, under treatment, would heal but break out again. When Dr. Lange first saw her, a week ago, there was a large swelling over the knee, which occupied mostly the inner and superior aspect of the knee and extended apparently into the substance of the vastus internus, presenting itself to the touch as a hard lump the size of about a fist. There was considerable effusion into the joint, which caused pain on walking. Over the top of this swelling the skin was gone to the extent of about a fifty-cent piece, and an ulcer existed with abrupt edges, from which a scanty, watery fluid exuded. The bottom of the excavation had a dark appearance, while the outer parts, overlapped by the projecting integument, were yellowish, and had the appearance of necrotic tissue. There were old scars on the leg below. The diagnosis of malignant disease was excluded, leaving that of syphilitic gumma. Under anti-syphilitic treatment the effusion and pain had largely disappeared and the tumor had decreased in size. Whether complete cure would take place without surgical interference was a question. Dr. Lange remarked that to him as a characteristic of gummatous tumor, as observed in a large number of cases, had appeared the subacute character of the affection and the progress of the process in a centripetal direction without regard to the tissue involved. The present case had probably started as a syphiloma of the muscular vastus internus. It had gradually involved the capsule of the joint and the skin, and undergone necrobiotic changes with no marked tendency for demarcation. These yellow gummatous necrotic masses will often remain undetached for many weeks, while a watery secretion takes place.

Dr. GERSTER said that a number of years ago he had seen a similar case to this, in which a colleague had made the diagnosis of sarcoma of the knee, the diagnosis being fortified by microscopic examination of a portion of the involved tissue. On closer inspection of the parts just before the patient was put under ether for amputation of the limb, it was thought best to give him another week's grace and try iodide of potash. The consequence was that he was discharged cured in five weeks without operation.

## HEMORRHAGE FOLLOWING RUPTURE OF A TUBAL PREGNANCY; LAPAROTOMY; RECOVERY.

Dr. FRED. KAMMERER presented a young woman upon whom he had operated for hæmorrhage following the rupture of a tubal pregnancy. Eleven weeks before her admission to the hospital she menstruated at her regular time, but since then she had been flowing irregularly, and had had much pain in the abdomen. When she was admitted she was very anæmic; a tumor was felt, filling most of the pelvis and reaching, on the left side, up to the level of the umbilicus. In consequence of this somewhat lateral situation of the mass an incision was made at the outer border of the left rectus abdominis. After incising the peritonæum it was seen that the tumor was composed of clotted blood only. Besides, the entire abdominal cavity was filled with fluid blood sufficiently changed in color to allow of the inference that it was not a recent extravasation. After clearing out the entire mass of coagula, especially in Douglas' pouch, the left tube was found ruptured and was ligated and removed. A large mass of sterilized gauze was inserted into the cul-de-sac, its ends protruding from the lower angle of the abdominal incision for drainage. The upper angle of the wound was closed and the entire abdominal cavity remained filled with fluid blood, no irrigation being practiced. On the evening of the operation the patient was somewhat collapsed, but stimulation revived her. A steady rise of temperature began, which culminated on the evening of the day after the operation in a temperature of  $106.2^{\circ}$ , with a pulse of 136. On the following day the temperature ranged between  $102^{\circ}$  and  $104^{\circ}$  and gradually decreased until the sixth day, when it was in the neighborhood of  $100^{\circ}$ . On this day the tampons were removed for the first time, they having heretofore answered the purpose of drainage well. After this the patient made an excellent recovery. At no time after the operation were there any alarming symptoms, save those from the high temperature. There was no tympanitis and no vomiting; the large wound cavity was in the very best of condition after the removal of the tampon. In view of these conditions some difficulty presents itself in accounting for the high temperatures, which certainly placed the patient on the day after the operation in a most critical condition. The speaker thought that they could not well be explained otherwise than by absorption by the peritonæum of some of the constituents of the fluid blood. It was not improbable that the manipulations in the



abdominal cavity, in fact, the opening of the cavity itself, should have led to the formation of fibrin ferment, which we know causes aseptic fever by its absorption. Then, again, it was his custom to allow his patients no fluids after laparotomy for the first twenty-four hours, and one must bear in mind the stimulus which the absorbing power of the peritonæum receives from such treatment. Although opposed to irrigation of the general peritoneal cavity after operation in all cases of localized effusions, whether purulent or hæmorrhagic and aseptic, he thought the procedure justifiable when the entire peritoneal cavity was affected. In general suppurative peritonitis he had himself seen no results from this treatment, but when the abdominal cavity was filled with aseptic fluid blood, the formation of fibrin ferment and its absorption in connection with the presence of an excellent material for the growth of germs, should such have been introduced, seemed to warrant irrigation in this particular instance.

Dr. LANGE considered it very likely in Dr. Kammerer's case that the temperature was due, as had been suggested, to blood ferment. He had had a case of the same nature in which considerable blood was left in the abdomen, but there was very little rise of temperature. Bearing on this point, he said a very interesting case had been reported by Langenbeck, that of a cystic tumor connected with a vein, accompanied by temperature elevation for a long period, and which ceased after the tumor was removed. The elevation of the temperature was attributed by Langenbeck to the entrance of blood ferment into the circulation.

Dr. KAMMERER said, in reply to an interrogatory by the President, that there was nothing in the local or general condition of his patient which pointed to septic infection, and hence his conclusion that the rise of temperature was due to the absorption of a toxic ferment.

## EDITORIAL ARTICLES.

### GUEILLIOT ON THE CONTAGION OF CANCER.<sup>1</sup>

M. O. GUEILLIOT has made a careful study of this subject, reviewing the literature and examining the sections of France where cancer seems to be more prevalent than in other places, with a view to determining whether the facts sustain the possibility of the disease being contagious. He first defines contagion as "the act by which a specific disease is communicated from an infected individual to a healthy one, either by direct or by indirect contact."

In opposition to the views of Virchow, Cornil and Ranvier, and in accordance with those held by Waldeyer, Robin and Lancereux, he contends that the epithelial origin of cancer is being more and more admitted, and in this study he considers carcinoma and epithelioma identical.

In the last century cancer cases were refused admission to the Hotel Dieu, at Rheims, and a special hospital was constructed in the city for the care of this class of cases, but the neighbors raised so much objection, declaring that the disease was contagious and consequently a menace to the neighborhood, that it was removed outside of the city limits. It was not until 1841 that cancer subjects were admitted to the San Marcoul Hospital in separate wards. Velpeau considered that although the contagion of cancer was not proven it was still possible. In 1885 John Hall reported five cases where cancer attacked both husband and wife, and T. Barthélemy insisted upon the possibility of the inoculation of cancer in old cutaneous lesions, and Ledoux Lebard published a remarkable work on the parasitic nature of cancer. In 1887 there appeared simultaneously in England, America and France several observations on the subject, but it remained for Dr. Arnaudet, of Corneilles, to indicate the proper

<sup>1</sup> *Gazette des Hôpitaux*, 130, 1892.

method which should be pursued in order to arrive at proper results. He studied the topography and chronology of cancer, first, in his own and then in neighboring villages, and expressed the opinion that cancer is contagious, and that it is transmissible through the medium of water and habitation.

Gueilliot reports the case of a husband and wife and servant who died of cancer within a few years of one another, and in 1889 the Medical Society of Rheims took up the investigation. In 1891 M. Gueilliot addressed a letter to physicians, asking them to furnish him with all the statistics they had in their possession bearing upon the subject, and he received many replies, so that he presents in this paper the statistics furnished by thirty unpublished cases, in addition to those already placed on record. Fabre, who also made a study of this subject, has stated that "the contagion of cancer is possible, and can be explained through the grafting of a cancerous cell upon a healthy organism." Bazin has insisted that gouty subjects are particularly prone to cancer, especially of the rectum and the bladder, and Verneuil and Bouchard have made similar statements. Heredity has been given too much importance in the etiology of cancer, and it is responsible for only about ten to fifteen per cent. of the cases, leaving from eighty-five to ninety per cent. whose cause must be determined.

Cancer usually appears as a tumor growing at the place of origin, without at first having any effect on the general organism, which becomes infected secondarily, so that there is first localization and then propagation. It first spreads by continuity from cell to cell, and is then carried to a distance by the lymphatics and the veins.

If we agree with Odenius, Bard and Brault that the cancerous cellule is the agent of infection, the whole evolution of the disease is easily understood; thus, too, the different forms that it assumes may be explained. According to some opinions cancer is a general disease from the outset, and the tumor is only a localized manifestation of it, consequently surgical intervention is useless, save as a palliative measure; others consider that the disease is at first local, and this

local grafting produces a true infection which finally ends in the cachexia.

It was supposed in 1887, when Rappin announced the discovery of the cancer microbe, that the origin of the disease was explained, but so far this discovery has not been confirmed. The parasite of cancer is not a microbe, but it is a sporozoa or psorosperm. These have been observed by numerous investigators; other histologists deny the parasitical character of these psorosperms, and assert that they are only cellular modifications, while still another class consider that a coccus exists, but that its presence has no connection with the evolution of the disease.

Wehr inoculated dogs with carcinoma taken from an animal of the same species, and found at the autopsy a cancer of the retro-peritoneal glands. Hanan in 1887 grafted pieces of epithelioma of the vulva taken from a rat into the vaginal walls of other animals of the same species, and not only obtained an evolution of the disease at this spot, but also secondary centres in the peritonæum, and he was able then to inoculate a second series. Morau's results are particularly conclusive. He grafted in the axilla and on the groin of mice fragments of a cylindrical epithelioma taken from another mouse, and produced a tumor of similar character. New grafts were made with the secondary neoplasms, generalization took place, and he continued his experiments to the eighteenth consecutive graft. Later on he showed some mice in whom the grafted tumor remained passive during gestation, but grew rapidly after confinement. Up to the present time no attempt to graft cancer from man to an animal, or from one animal to another of different species has been successful, except in some cases reported in a preliminary paper to the Royal Academy of Belgium, July 30, 1892, where human cancer had been successfully grafted upon some white mice.

Observation proves that a traumatism, a superficial lesion of the skin or of the mucous membrane, or an erosion, may be the starting point for a malignant neoplasm. Cancer does not appear in the normal skin, because there is no irritation. It appears as though the

place of entry must be open for a certain time, as inoculation proceeds slowly. If, as in syphilis or tuberculosis, we admit of the possibility of external inoculation, all would be very easily explained. The cancerous germ comes in contact with a fissured surface more or less denuded of its epithelium and grafts itself there, growing with more or less rapidity. The most likely places for this to occur are the margins of the orifices where there are two membranes of different structure, or where the circulation is very active. The period of incubation is generally very long, and where the germs have engrafted themselves on an open wound they may remain quiescent for a long time, when through the influence of age and general enfeeblement of the constitution the spot becomes favorable for their development.

Clinical experience has also demonstrated the possibility of auto-inoculation of malignant tumors. Velpeau has seen a secondary nodule appear in the vagina at the level of a cancer of the neck of the uterus and recur five times, and this condition is confirmed by Gueilliot, Kraske, Albarron, Devic and Chatin.

A septuagenarian, a great smoker, who had a cancer just starting at the base of the tongue, was seen a few months ago, but he refused an operation, and was not seen again until some time later, when the tumor had doubled in size, ulcerated badly, and a budding ulceration, evidently epitheliomatous, had formed on the corresponding anterior pillar of the fauces and neighboring portion of the cheek, so that the two ulcerations were absolutely symmetrical and superimposed.

The secondary nodules in the skin following the puncture of a cancerous ovarian cyst have been observed (Waldeyer, Nicaise, Quinke, Terrillon), and it is a question whether cutaneous relapses after the removal of cancer, particularly of the breast, may not be simply grafts which have occurred at the operation. At any rate, it would be prudent to avoid, so far as possible, the *morcellement* of these tumors.

E. Hahn, in 1886, having chloroformed a woman suffering from an inoperable cancer of the breast, cut out three fragments from this tumor and transplanted them into the other breast. The woman died three

months later from a generalization of the cancer, and the histological examination showed that the nodules developed at the inoculated points had the same structure as the original tumor. Bergmann confesses to having repeated Hahn's experiments. Many consider that generalization is simply a graft, and since 1878 Cohnheim and Maas have admitted that metastasis was due to a proliferation of cancerous emboli.

We have personally had during the past year a case of recurrent cancer of the breast which was being treated by injections of pyoktannin. For a considerable period the growth seemed to be arrested, but finally, and almost simultaneously, there appeared a tumor in the opposite breast, another in the lung of the side originally affected, another in the right lobe of the liver, and also one on the left side, apparently in connection with the stomach, and a week or two later the patient developed cerebral symptoms that seemed to point to a tumor of the brain. We felt that this generalization of the cancer must have been due to the liberation of cancer elements by the needle which, being taken up by the blood and lymph currents, were deposited in the different organs that were affected secondarily.

Virchow and Paget have found coagula in the veins containing epithelia, and the study of cancerous lymphangitis apparently confirms this view.

That a cancer cannot be grafted upon a person already afflicted with the disease does not prove that this attempt might not be more successful upon a well person, but the success of animal inoculations renders the possibility of human inoculation probable. To succeed, however, the same precautions must be observed as in inoculating animals, and especially to choose receptive subjects who are old and present the proper conditions for the reception of the disease.

In Paris 104 people die of cancer on an average out of every 100,000 inhabitants, and a study of the locality of the disease is very peculiar, and has not varied in twenty years. Thus the poor districts of Gobelins and the Observatory give an average of 137-145 deaths from this cause, while the richer and more cleanly districts of the Pantheon and the Elysee give but 75.

The same ratio is found in the other large cities, Rouen and Rheims. In Lyons the average reaches 163. Formerly there was a tendency to believe that cancerous affections were rare in the country, but it is now known to be very common, and in certain villages its ravages are absolutely appalling. At St. Sylvestre de Corneilles, a little village of Normandy, the ratio of deaths from this disease is 345 to every 100,000 inhabitants—three times greater than in Paris: at St. Leonard, the ratio is 200; at Ardennes, 266; but the largest is that reported by Dr. Manichou, of Oulchy-le-Chateau. In twenty years there were 864 deaths from cancer in seventeen communes of his practice, the entire population of which was only 3,000. This gives an annual mortality of 1,400 per 100,000.

Although heredity and consanguinity play an important rôle in the development of cancerous taints, they are not sufficient to explain this great disparity in the ratio of different localities. Thus in M. Manichou's practice the infected villages were all north of the river Ourcq, while another village where the infection has been studied by M. Duplee was isolated. These facts lead to the question whether there may not be some condition of the soil or of the water, or that some topographical cause may be responsible for the propagation of the disease. In order to obtain more precise information the observations must be limited to a single quarter, or a single group of houses. Thus in 1880 M. Arnaudet reported the death of a man from cancer of the stomach who lived on the plateau of St. Sylvestre. In 1884 another patient living on the side of the hill died from the same cause, and in 1885 two others who lived at the foot of the hill were carried off in the same way, while in 1887 the fifth member of this group, who lived in a house adjoining that in which the first case was observed, succumbed to the same disease. There was no heredity in these cases, and such an accumulation of cases living within 300 miles of one another would naturally suggest some local cause. The cancer traveled regularly from the top to the bottom of the hill, and the water supply might have been suspected except for the fact that none of the patients were water drinkers, but M. Arnaudet suspected

the cider which was made from the water of the pools. Some time after publishing this series of cases the same observer found a cancer of the breast in the wife of one of these peasants.

The study of another cancerous locality in a street in Corneilles allowed Dr. Arnaudet to carry his investigation into the etiology of the disease still farther. In thirty years seventeen houses out of fifty-four furnished twenty-one cases of cancer, and some of the houses about half way up the street seemed to form a nest for tumors. In 1884 five cases were attacked at about the same time. Here the water might be suspected, but the dwelling must also be taken into consideration, and it is probably the fact that this condition of infected habitations may often be the true cause of cases that are considered hereditary. In 1891 the same surgeon reported a new series of observations confirming the common action of dwelling and water in the production of cancer, and he then presents the following conclusions :

(1) The great frequency of cancer in country places indicated that there is some cause for the disease outside of the organism.

(2) Water is the most common medium of inoculation, as is proven by the numerous cases found on plateaus, where there is not a pure water supply.

(3) The germ is carried to dwellers in the same house directly or indirectly through objects contaminated by former patients.

Another example is furnished by M. Firssinger, at Oyonnax, where three or four cancerous patients died yearly out of a population of 4,500 housed in 500 dwellings. Here a group of three houses at the end of the village supplied in four years four patients, not including one case of osteo-sarcoma. These people were strangers to each other; and there was no hereditary predisposition. The disease seems to have been imported into the village by a woman who arrived in 1886 and who had a cancer of the breast, and who was in the habit of throwing her soiled dressings out of her front door. She died in 1887, and the next year a tenant in the same house died of cancer of the penis, and two years later another died of cancer of the rectum.



while in 1888 a neighbor was attacked with cancer of the stomach. M. Roy, of St. Martin-de-Re, also reports an instance where in less than two years three neighbors died of cancer of the breast, stomach and rectum.

In a little village of the Ardennes Gueilliot saw first a man die of cancer of the rectum in 1870, the wife succumbing to cancer of the breast in 1873, and the servant from the same disease the same year, while the father-in-law died of cancer of the rectum in 1875. Blyth tells of three persons becoming cancerous in the same house, and a friend who often visited them contracting the disease. The niece of the latter was also infected. Lucas has also seen three deaths in the same house within a few years. Other cases might be cited, but we have quoted enough for our present purposes.

In other cases the communication is more direct, as in husband and wife both dying of cancer within a short time of each other.

Altogether seventy-seven cases have been collected—In seventy-one, the two affected were husband and wife ; in six, two persons living together, master and servant.

In nineteen the cancer affected the same organ in both—Stomach eleven times ; mouth four times ; integuments twice.

In fifty-eight it attacked different organs, and among these are indicated twenty-three where the cancer appeared in the penis of the husband following uterine cancer in the woman. This proportion is very surprising, and proves that the rarity of bisexual cancer is more apparent than real. The long period of incubation of cancer probably explains the almost universal opinion against the danger of conjugal intercourse when the uterus is the seat of epithelioma. Demarquay, it is true, out of 134 cases of cancer of the penis, only once found a cancer of the uterus in the wife, but Gaillard Thomas has recognized the danger of the inoculation of cancer under these conditions.

These examples, then, are in favor of the contagion of cancer by direct contact, inoculation or grafting. Delbet reported to the Anatomical Society the case of a child dying of general cancer. Its

mother had nursed it, although she had a tumor of the breast. A surgeon of Dorset (Emson) died of cancer eight months after having pricked his finger while operating on a malignant tumor.

But in most cases a single contact is not sufficient.

Nothing favors contagion more than promiscuous intercourse and habitation.

Richard Budd has reported that five surgeons of the cancer hospital (North Devon Infirmary) who died in succession of this disease contracted it from their patients.

Contagion seems also to be carried by soiled linen and objects of common use. M. Dève gives the history of a young man of 38 having no hereditary taint who was attacked with cancer of the tongue. Some years previously his father-in-law had died of an epithelioma that originated in the nose, and finally covered the face and the superior maxilla. The son-in-law had been in the habit of smoking his father-in-law's pipes. M. Molliere also had a similar case, except that here there may have been an hereditary predisposition in the younger man, as his sister died of cancer some years later.

It is possible that the germ of cancer can live outside of the organism, like the germ of typhoid fever, cholera, anthrax and others. Hidden in those excellent breeding places, water and soil, or lodged in the nooks and corners of a house, it may at the favorable moment be absorbed and become the starting point of the disease. It is probably often introduced by drinking, for it is epidemic about the ponds of Normandy and Champagne, and it is especially frequent on the marshy plateau of Rocroi. M. Ballance says that in England it seems especially prevalent along the courses of rivers subject to periodical overflows. This idea agrees with Metchnikoff's theory that the coccus gives birth to spores which develop outside of the human system, and that eventually cancer will be considered as a miasmatic disease.

The incubation, judging from our observations, may be of variable duration. In forty-three cases the exact dates are noted. In these the interval between the deaths of the two patients was:

One year and some months, sixteen times.

Two years, six        "

Three   "               five       "

Four   "               twice.

Five   "               "

Five to ten years, nine times.

Ten to fifteen   "       three   "

It is seen then that thirty-one patients died during the five years following the death of the first case. There is nothing surprising in the long incubation noted in the long cases, as they belong to incomplete observations, and even in heredity the same thing is noticed.

There is in both hereditary and acquired cancer a longer or shorter period of incubation, which Prosper Lucas calls the "occultation of morbid phenomena." The latent period is often shorter in the acquired than in the hereditary cases. In one-third of the former it does not exceed one year.

The contagion is undoubtedly slight, or, as Velpeau puts it, "it is not easy." it requires a receptive condition, which fortunately is not often found.

SAMUEL LLOYD.

## IVERSON ON PERI-UTERINE SUPPURATION.

PROF. A. IVERSON, of Copenhagen,<sup>1</sup> has contributed an interesting study of this subject, together with a tabulation of cases, which is worthy of reproduction here. He says that whenever the uterus, tubes and ovaries are inflamed that portion of the peritonæum surrounding them is also affected. It was formerly necessary, in order to obtain an explanation of pelvic inflammations in women, to make an exploratory laparotomy, but the increased knowledge obtained in consequence of these salpingo-oöphorectomies of the pathological conditions has enabled observers at the present time to make more accurate diagnoses than formerly. It is still a question how the disease

<sup>1</sup> Deutsche Medicinische Wochenschrift, October 6, 1892; October 13, 1892; October 20, 1892; October 27, 1892, and November 3, 1892.

gains entrance to the peritoneal cavity, whether through the walls of the tube, through the lymphatics, or directly through the ostium abdominale, and whether the peritoneal inflammations are caused by micro-organisms or by mixed infections. There have been instances where during a laparotomy the so-called pus of a dilated and diseased tube has escaped into the peritoneal cavity without causing any inflammatory trouble, and it is now recognized that this pus must be sterile. The cases utilized in the preparation of this paper show that fourteen of the patients had borne children, eight had never been confined, twelve had never had any miscarriages and four had had one or more. In the cases where the pelvic trouble was present in women who had borne children, the interval elapsing between the confinement and the origin of the disease was too long for this to be considered as the starting point of the disease, particularly when the confinement had been perfectly normal. Very few of these patients gave a history of any premonitory symptoms before the full establishment of the pelvic lesion. The disease in fifteen cases originated without previous pelvic distress.

It eighteen cases menstruation had always been regular, and in all of them the lesion appeared simultaneously with a menstrual period, the hæmorrhage being either increased or completely arrested.

In pelvi-peritonitis we find first, exudation, and second, adhesion.

Although it may be assumed that salpingitis is very frequently the starting point of the disease, it should not be taken for granted that the peritonæum was perfectly normal prior to the violent appearance of the disease. Small cysts are often found in laparotomies bound down by adhesions, or buried by them in Douglas' cul-de-sac. Their contents may be either serous or purulent; clinically, their contents look like pus, and in other cases the adhesions are covered with a fibrinous yellowish layer, closely resembling pus; at any rate, these adhesions can only be the result of some inflammatory trouble which has produced a limited peritonitis. In all probability the exudation is large from the very beginning, and it is

quickly limited by adhesions, so that the whole peritonæum is very rarely attacked. These adhesions may become so thick in time that they completely disguise all suppuration, and give the impression of a solid mass, when in the earlier stages fluctuation could be readily determined. As a rule the exudation is found filling Douglas' cul-de-sac more or less completely, or it may fill the whole pelvis, displacing the different organs in various directions, and at times it even extends upward into the abdominal cavity, often as high as the umbilicus. This may break a path through the subperitoneal connective tissue and other organs, and sometimes healing occurs spontaneously, because the pus escapes through organs which allow of its evacuation without dangerous consequences. Dolbet has collected thirty-eight cases where this occurred, and the rectum has been the most frequent way of escape. Frequently this evacuation is but partial, and the abscess is not usually much diminished in size. The dangers when the evacuation takes place into the peritonæum and bladder are well known. The older and harder these exudations are the more difficult it is to overcome them. If the connective tissue of the pelvis is also affected, and there is also secondary development of bone disease, the result must be fatal either by hectic or by amyloid changes in the kidney. The neuralgias are a natural result of the retractions of the scar tissue.

The disease usually begins very abruptly, like an acute general peritonitis. There is marked fever, considerable sensitiveness in the abdomen, permitting neither manipulation nor movement, and vomiting leads to the suspicion of some serious condition. Rectal and vaginal examination aid in the diagnosis, but those regions may be so sensitive that examination becomes impossible. Finally, the local peritonitis becomes evident and a fullness of the pelvis may be readily determined. The uterus is pushed forward so that the collum uteri is driven toward the symphysis and the rectum is compressed, and Douglas' pouch is pushed downward and completely filled; its surface being smooth, the consistency differing according to the stage

in which the investigation is made ; sometimes fluctuation is present, but sometimes only a firm, elastic tumor can be felt.

In nineteen out of the twenty-two cases reported the greater part of Douglas' pouch was filled by a tumor, and this could be made out above the symphysis in eighteen, while in eight it extended to the umbilicus. The tumor is usually fixed, and seems closely attached to the pelvis. The fever may entirely disappear, although the temperature may indicate a typical pus curve. The pains may become intense, radiating down the legs, usually along the sciatic nerve. Bladder symptoms, which were troublesome at first, rapidly disappear, but the rectal symptoms continue. Usually a considerable swelling of the mucous membrane of the rectum can be made out ; and this is a valuable symptom, as it may indicate a tendency to perforation into the rectum. There may also be a slight hæmorrhage from the uterus.

This condition might be confounded with a retro-uterine hæmatoma, a single or double pyosalpinx, or a suppurating ovarian or dermoid cyst. It is now admitted that these hæmatocœles are caused by the rupture of a tubal pregnancy, or by a chronic salpingitis, producing hæmorrhages, or by a hæmorrhagic peri-salpingitis and pelvi-peritonitis. The rupture of varices in the ligaments is of too rare occurrence to be taken into consideration.

Pyosalpinx is generally doubled-sided, and the dilatation and morbid changes in the tubes usually can be made out in Douglas' pouch, but the tumors seldom attain any considerable size unless the pyosalpinx is accompanied by a peri-salpingitis or suppurative pelvi-peritonitis. A single incision and drainage is rarely successful, but owing to the firm septa that form, counter-openings are usually necessary.

The bladder requires attention. Retroflexion of the uterus is often accompanied by retention of urine, and the bladder can then be made out above the symphysis.

The most important point is to ascertain whether pus is or is not present. In the case of abscess in Douglas' pouch it should be

evacuated. Vaginal evacuation has the disadvantage that the muscles of the vagina are apt to decrease the size of the aperture and push out the drainage tube, and antiseptics cannot be applied very thoroughly. Pean's method of removing the uterus by morcellement is recommended. The pus in favorable cases is not seen until the extirpation of the uterus is complete, when the different suppurating sacs are opened with the finger. In case they are opened before the uterus is removed, they should be evacuated. The cavity should be thoroughly washed out and packed with iodoform gauze.

The operation is difficult: it is not easy to ascertain the exact position of the uterus in relation to the large tumor, and the direction of the dissection depends upon this point: it is difficult in stiff and solid peri-uterine infiltrations to ascertain the lateral borders of the uterus and the proper place for the location of the forceps on the ligaments. The uterine sound does not aid us here for, owing to the contractions and the flexions, it cannot be introduced. There is always a parenchymatous hæmorrhage during this dissection from the lateral ligaments, but it is insignificant because the vessels in these chronic suppurating processes usually become atrophic and their size decreases. The after-treatment is very simple: The forceps are removed at the end of forty-eight hours. If the temperature has fallen and rises again, retention of pus should be suspected and the cavity should be very carefully examined. The wound usually closes very rapidly. The objection has been raised that this operation sacrifices a normal organ, but the uterus in these conditions is never normal, chronic endometritis and metritis (usually the starting point of the disease) always exist, and never allow the organ to exercise its physiological function, and when the disease in the adnexa has reached an operative stage there can be but little doubt but that the individual is sterile. The uterus then is of no consequence and its removal is justified. If the adnexa alone are involved in the disease, laparotomy would be the preferable operation.

SAMUEL LLOYD.

## INDEX OF SURGICAL PROGRESS.

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### HEAD AND NECK.

**I. A Case of Very Extensive and Comminuted Fracture of the Cranium, ending in Recovery.** By DR. HOLGER ROERDØY (Saxkjøbing, Denmark). A seventeen year old peasant was thrown from a runaway wagon and tossed upon his head against a stone. After the accident the patient got up and walked about 500 yards to his master's house. When seen, an hour after the accident, he was greatly collapsed, unconscious, and now and then suffering from tonic and clonic spasms. In the middle of the forehead, extending from the inner edge of the left eyebrow to the outer end of the right eyebrow, and above up to the edge of the hair, there was a large contused wound, at the bottom of which the depressed cranium was to be seen, the fracture being about seven centimetres in length and four in breadth, and the points of the splinters being one centimetre deeper than their base. Under chloroform narcosis, with the hammer and chisel, the depressed fragments were removed and the edges smoothed off. The pulsating brain then presented itself at the opening, while a small tear in the dura mater was all that could be discovered. Five fragments in all were removed, one of them being of the size of a dollar, one of that of a half dollar, and three smaller ones. The wound was sutured, dressed antiseptically, a strip of iodoform wicking being introduced at the lower corner of the wound in order to insure drainage. During the whole course of the disease the temperature was normal. Fifty-two days after receiving the injury he was discharged from treatment, the wound having greatly decreased in size. Neither the nervous system nor the mind of the patient seemed to have suffered from the accident. A brass plate was made for him to place on his head when he wears his hat. Six weeks after the injury he walked some eight miles to his home.—*Hospitals Tidende*, No. 35, 1892.



## II. Bilateral Osseous Anchylosis of Temporo-Maxillary Articulation. Resection of the Condyles by Bottini's Method.

By DR. R. BORELLA (Novara, Italy). A tailoress, unmarried and twenty-four years of age, in her fifth year fell from a balcony, at a height of twelve feet, and struck with her extended chin upon the stones below. Slight unconsciousness of short duration followed, and contusion of the skin, with breaking of a tooth, but beyond this there were no other injuries. The jaw was very painful and accompanied by a sense of rigidity in the front of the ears, which persisted and increased so that, during the first two years following, the diet was a mixture of solid and liquid food, after which it was exclusively fluid. When the patient came under the writer's observation she was normally developed, and all her organs performed their functions properly, and her intelligence was good. The lower jaw was abnormally small, undeveloped and retreating like that of an idiot or a batrachian. The jaw was fixed and immovable; even under chloroform it was impossible to move it beyond a millimetre. The angle of the jaw very obtuse. Speech was very imperfect, and a fetid odor emanated from the mouth. There were neither adhesions between the bones and the mucous membranes of the buccal cavity, nor fibrous bands in the masseter muscles. Bottini's operation was done, in that an incision four centimetres in length was made, one centimetre and a half in front of the tragus and running parallel to the temporal artery, with care not to injure the branches of the facial nerve or the duct of Steno; the periosteum of the condyles was separated from the bone. Resection was done beneath the articular tubercle. Koenig's buccal dilator was introduced between the teeth and the mouth opened five centimetres. The length of the two fragments was each two centimetres. There was no trace of a meniscus nor of a fibrous capsule. For the first three days after the operation she was limited to a liquid diet. The wound was closed by two series of sutures, one including the fibres of masseters and the masseteric fascia, and the other the skin. Healing took place by first intention, though on the left side a small salivary fistula formed from lesion of

some few follicles of the parotid gland, which was made to close by touching with the thermo-cautery. Solid food was added to her diet, and both passive and active movements of the jaw made, so that she could open her mouth some four centimetres and, in consequence, her general condition greatly improved. She left the hospital the eighteenth day after the operation. In a note added, the writer states that ten months after the operation he came across the patient and found that she had had an attack of typhoid fever, and confined to her bed for thirty days, on liquid food. In consequence of this diet the patient was in nearly the same condition as before the operation, though the jaw could be opened by using some force, and there was a certain amount of rigidity in the temporal and masseteric muscles. He intends to perform forcible dilatation under chloroform.—*The Gazzetta Medica Lombarda*, 1892.

FRANK H. PRITCHARD (Norwalk, Ohio).

**III. Impacted Peach Stone Removed from Œsophagus through Wound in Stomach.** By DR. J. M. T. FINNEY, Baltimore. The patient, a man forty-nine years of age, had accidentally swallowed a peach stone which had become impacted in the œsophagus at a point thirty-two centimetres from the incisor teeth. At the end of four and a half days, having been meanwhile unable to swallow anything but a half-teaspoonful of water at a time, and having been subjected to repeated unavailing attempts to remove the obstruction, he was subjected to gastrotomy. Forceps introduced through a small opening in the stomach readily entered the œsophagus and touched the stone, but could not remove it; the stomach wound having been enlarged sufficiently to admit the whole hand of the operator the finger was likewise passed up the œsophagus but could hardly touch the stone. A small probang was then introduced through the stomach into the œsophagus, passed up and by the stone until it came out of the mouth; a sponge was tied to the probang as it protruded, and then it was drawn back, pulling the sponge after it. This manœuvre was successful in dislodging the stone from the lateral pouch which it had

made for itself, so that it was hooked by the finger and brought into the stomach from whence it was finally removed. The wounds having been sutured, the patient made an uneventful convalescence for two weeks. Then he began to manifest symptoms of mediastinal sup-puration, which by the end of two weeks more had declared itself fully as a large pus collection between the diaphragm and the left pleural sac. A portion of the eighth rib was excised, the cavity opened and drainage established. Steady improvement followed with ultimate complete recovery.—*Johns Hopkins Hospital Bulletin*, 1892, No. 26

## CHEST AND ABDOMEN.

**I. A Case of Actinomycosis of the Lung.** By DR. ROSWELL PARK (Buffalo). The patient, a male, aged thirty years, some two and a half years before coming under observation, spent a winter at the stock yards, clerking and assisting in office work in the main, although coming in contact with cattle. At that time he was strong and robust; since that time he has never been well. He had seen two or three cases of lumpy-jaw in cattle. During that season he began to cough, and from that time he has been more or less troubled with a constant cough. Some months later he began to complain of vague and indefinite pains on the right side. At one time he was quite an athlete, but his companions noticed, during the summer of 1891, that he was not as strong, and that he seemed greatly exhausted after even comparatively little violent exercise. He became paler and somewhat emaciated. About four months ago a surgeon, who detected pseudo-fluctuation in this mass, made an incision. A quantity of material was discharged, which did not look like ordinary pus, but seemed a sort of *débris*. About this time the young man took to the house, and later to the bed, complaining of constantly increasing pain and soreness in the region of the liver and lower part of the right lung. At various times different spots in the area above alluded to would soften apparently as when suppurating, acting much like small abscesses, and would be incised, discharging

material of the same character as before. In different directions a probe would pass to a depth of from two to four inches. He was in this general condition, growing steadily worse, when first seen by the reporter. At this time he moved in bed with difficulty, was very pale and emaciated, pulse weak, sweating easily, and looked much like one in an advanced stage of consumption. On the right side, over the ribs, was a brawny, livid swelling, with several sinuses, into which the probe passed to different depths. The patient was coughing frequently, and raising sputum much like that of consumption. An incision into one of the little areas gave vent to sanguineous fluid, in which were little yellow particles, like minute particles of cheese. There was an extensive area of dullness, the liver seemed much enlarged, and either it was enlarged upward or the lower portion of the lung was consolidated: still dullness, upon percussion, extended almost up to the line of the nipples. Microscopical examination of specimens of the sputum and of the discharge showed abundant actinomycotic fungi. An attempt at relief was made by resecting the three ribs most involved in the mass. A large portion of sloughing tissue was cut away with the ribs, and the sharp spoon was used freely without reaching the limit of the diseased mass. The collapse of the patient necessitated the suspension of the operation. Death from shock shortly afterward occurred.—*Buffalo Medical and Surgical Journal*.

**II. A Case of Actinomycosis of Intestine.** By DR. S. LAICHE (Christiania). A coachman, thirty-eight years of age, had always been well, except two years before, when he sought medical aid on account of a digestive disturbance. This was relieved by diet, though his friends observed that he had been very anæmic for several months. Two months before entering the hospital (November 28, 1888), he had noticed the dyspeptic symptoms more than ever, heaviness after meals, vomiting, an indefinite painfulness in both groins, running over to the insides of the thighs, while soon after he began to notice a disagreeable scratching feeling in the left side of

the abdomen. Four weeks before entrance they increased in severity, and radiated out toward the two iliac fossæ, especially the left; they were not always present, but especially on violent exertion or heavy lifting. During the last four weeks he had slight nocturnal chills, being especially confined to the legs, which could not be gotten warm, while the last few nights he had had sweats. Three weeks before he had observed a tumor, which rapidly increased in size, during the past fourteen days suddenly to cease growing. Great emaciation in the last two months had become especially noticeable during the past two weeks, with constipation. The tumor was situated to the left of the umbilicus, a circular prominence of eight centimetres diameter, with the skin of a normal appearance, displaceable and unattached to the growth. The surface gave one the impression of a round, somewhat uneven prominence, well circumscribed at all points, except below where it seemed to go down into the depth of the pelvis, to be attached to the iliac fossa, and to be of an oblong shape. It was hard and of equal consistence, except a little spot in the centre, of the size of a quarter of a dollar, which was fluctuating. The tumor was immovable, and only on deep pressure was it sensitive. In the right iliac fossa a second tumor, of the size of a hazel nut, immoveable and non-sensitive, was palpable in the depth of the pelvis. There were also other tumors, of the size of a bean, in the vicinity of this second one, but they were not pointed like the larger one. Both groins presented a group of enlarged glands as large as a pea to that of a bean, and hard. On auscultation and percussion, coarse and sibilant râles were audible in the upper parts of both lungs. Urine normal. A trial puncture was made in the softened spot in the centre of the first tumor, and pus aspirated. No tubercle bacilli were to be made out, but on adding caustic potash to the pus, microscopically, several pale, rosette-like formations could be discerned, but no pronounced "actinomyces rosettes" could be found. The tumor continued to increase in size, the area of fluctuation to widen, until the greater portion of the surface of the skin on the left side of the abdomen, from the border

of the ribs to the inguinal fold, and from the linea alba to the anterior axillary line, was occupied. The skin over it was of a bluish color, while the whole abscess was opened and scraped, the bottom being apparently formed by the transversalis fascia. A large quantity of pus was evacuated, containing numerous yellowish points, of the color of sulphur and of the size of a pin-head. The cavity was packed with iodoform gauze and dressed. On changing the dressing the cavity was granulating, and with but little secretion. He complained but little of his disease, and was only bothered by a hacking cough. The rhonchous and sibilant râles increased in number, his general condition became worse, edema of the malleoli and lumbar region set in, actinomycotic rosettes were discovered, two abscesses developed in the right groin, which were opened, the dyspnoeic attacks increased in severity, his strength became very reduced, the cough grew obstinate, though the expectoration was not profuse, and, finally, on February 23, 1889, he died. The necropsy revealed an actinomycotic perityphlitis, with infiltration of the iliac fossæ on both sides and the pubis, associated with chronic peritonitis, a hepatic and perihepatic abscess, with perforation into the pleural cavity and consequent double pleuritis and slight pericarditis. The duration of the disease was, in all, five months. The diagnosis made from the peculiarity of the tumor in having a fluctuating point in its centre and in its stalactite-like running to a point. The vermiform appendix was assumed to be the point of departure for the disease. Actinomycotic perityphlitis has recently been described by Dr. Otto Lanz (Corresp. *Bl. f. Schweizer Aerzte*, 10-11, 1892). The disease is rare in Norway.—*Norsk Magazin for Lægervidenskaben*, No. 12, 1892.

**III. Strangulated Femoral Hernia Involving only Part of Circumference of Bowel; Enterectomy; Enterorrhaphy; Recovery.** By R. BORELLA (Novaro, Italy). A peasant woman, fifty four years of age, who had always been well and borne four children with normal labors, noticed a node of the size of a nut in the right groin when twenty-eight years of age. It had remained

indolent, appearing in the erect position and disappearing in the recumbent. She never wore a truss, as the tumor would not be visible for months at a time, and did not disturb her in her laborious daily work. October 13, while bending over the washtub, she was seized with a sharp pain in the right groin, which soon extended over the entire abdomen. She took to her bed, and an unsuccessful attempt at taxis was made. The next day vomiting set in, at first of a bilious and then of a fecal character. October 15, when transported to the hospital, she was weak, reduced in strength, her pulse small, frequent, the extremities cold, and the fecal vomiting still continuing. Her abdomen was slightly distended and painful to pressure. The two labia majora were eczematous. In the right groin were two tumors, one a small hydrocele of the round ligament, the second situated below Poupart's ligament, and internal to the femoral vessel. It was round, of the size of a chestnut, covered with normal integument, which could be lifted up in folds, dull on percussion, painful on pressure, the pains radiating into the abdominal cavity, non-fluctuating and irreducible. No increase in size on violent coughing. On account of the presence of the eczema it was thought to be a lymphadenitis following the vulvar eruption, but the existence of the tumor before the eczema, its appearance when in the erect position and its disappearance in the horizontal position, together with the local pain radiating into the abdominal cavity, absence of the passage of feces and flatus, the fecal vomit and the state of collapse, led rather to the belief that the intestinal canal was obstructed. An operation was done the same afternoon. The hernial sac was found to consist of very thick peritonæum, the strangulated gut was discovered to be the small intestine, which was of a greyish red color, softened, inelastic and devoid of its epithelial sac. No adhesions between the walls of the sac or the crural ring could be made out. The gut was washed with an antiseptic solution, the hernial canal enlarged and about twelve centimetres of intestine and the appertaining mesentery drawn out, when it was observed that the strangulated portion involved but two-thirds of the circumference of the intestine and at the part opposite

to the mesenteric insertion, where the gut was of the normal rosy color, and in marked contrast with the brownish tint of the remainder of the viscus. Billroth's method of clamping was employed, the intervening portion, about six centimetres in length, resected with the straight scissors. After antiseptic washing of the intestine, the mucous layer was united by means of an overcast suture, after fastening the mesenteric border in the same manner, by which means complete hemostasis was obtained. The material used was Lister's catgut (No. 1). The serous and muscular coats were united by Lembert's suture, leaving five millimetres of the sero-muscular coat between the entrance and exit of the needle. The intestine was replaced in the abdomen, the walls of the hernial sac drawn together with a catgut suture and the sac resected at the distance of a centimetre from the suture, together with a second continuous buried suture. The post-operative course of the case was favorable, and, beyond slight vomiting from the chloroform there was nothing of importance observed. On the sixth day a hard and painful stool was passed, and, on the eighth day of continuous apyrexia the sutures were removed, and on the fourteenth day after the operation the patient left the hospital without a truss. She was seen again a month after and a solid cicatrix and good health reported.—*Gazzetta Medica Lombarda*, 1891.

FRANK H. PRITCHARD (Norwalk, O.).

**IV. Report of Eight Cases of Cholecystotomy, with Remarks upon Technique.** By Dr. ARTHUR T. CABOT (Boston). The author first mentions the difficulty of dislodging stones from narrow ducts. To overcome this he suggests the use of a narrow loop of wire, small enough to slip along a narrow duct, having its outer surface rounded and smooth, while the inner edge is somewhat sharp, so that it may hold on to the calculus, when it has once been passed beyond it. He next mentions the embarrassments that attend attempts to incise the walls of a deep-lying duct for the evacuation of a calculus more or less movable, while important organs and vessels are lying close about the duct to be incised. He suggests the use of



a small hook, the point somewhat sharper than that of an ordinary aneurism needle, the inside edge of the hook being sharp. The point of such a hook can be rubbed through the wall of the duct down on to the stone, and then a slight traction on the hook will make it cut its way out and slit up the duct sufficiently for the easy removal of the stone.

The following is an abstract of his eight cases:

CASE I.—Female, aged thirty-eight, had a distended gall bladder from which, on September 30, 1891, four good-sized stones were removed. The walls of the gall bladder were stitched to the parietal peritonæum. Recovery without fistula.

CASE II.—A delicate woman of twenty-nine had an abscess in and about the gall bladder, caused by the presence of a large number of stones. This was opened and the walls of the gall bladder were stitched to the parietal peritonæum on December 9, 1891. The cavity about the gall bladder was an irregular one, and no stones were found at the time of the operation. After the operation many stones were discharged through the opening, and now, almost a year later, the fistula still discharges a glairy fluid. No stones have been discharged for a number of months.

CASE III.—Female, fifty years of age. Since May, 1891, has had twenty or more severe attacks of jaundice. When seen by the reporter she was rather thin, very much jaundiced, with a dry skin: the stools were clay-colored, and the urine was dark and contained much bile. Palpation showed doubtful resistance at the seat of the gall bladder. There seemed to be a mass there, indistinct, which moved up and down with the liver. Percussion showed the liver to be decidedly enlarged downward.

The operation was done on May 17, 1892. Oblique incision, just below the lower edge of the liver. Gall bladder found in a contracted condition, and opened. One stone was removed from it, and another stone was felt farther along, at the junction of the cystic and the common duct. Between the gall bladder and this second stone the duct was quite narrow. After dilating it as far as possible, many

attempts were made to remove the stone with forceps, and finally it was dislodged and pulled forward with a wire loop. It broke during manipulation, and was removed in two pieces. The gall bladder was stitched to the parietal peritonæum with catgut, and two anchoring stitches of silk. A tube was placed in the gall bladder.

The recovery of this patient was uneventful. The jaundice slowly disappeared, and it was not until June 13 that the stools began to show a decided color. On June 25 the sinus was finally closed. She has since remained perfectly well.

CASE IV.—A spare woman of fifty-one. Three or four years before she had occasional attacks of pain, referred to the right side. Two years ago she had a double ovariectomy for dermoid cysts, and made a good recovery. Eight or nine weeks later she had an attack of pain in the region of the liver, with moderate jaundice. This was somewhat more severe than in previous attacks, and she had chills and a high temperature with it. At the time that she began to grow better from this attacks he vomited what seemed to be pus. She was then well until November, 1891, when she again had chills and high temperature. Jaundice soon developed, and persisted from that time. Through the winter she had her ups and downs, but on the whole she lost flesh and the power of taking food. When seen in June, 1892, she was deeply icteric; the liver was small, with nothing to feel, and no sensitiveness to superficial pressure; but on deep pressure beneath the cystic notch, if a long breath was taken at the same time, a tender spot was reached.

Incision parallel to and below the edge of the liver. The gall bladder was much shrunken. The stone which was causing the trouble was found impacted in the common duct, close down to the duodenum. Much difficulty was found in so exposing the parts that this duct could be incised and the stone removed. It was finally accomplished, however, and a drainage tube was placed in the cavity from which it had come, with gauze packed around it to protect the general peritoneal cavity from the invasion of bile. The operation was a difficult one on account of the depth at which the stone lay.

At the end of the operation there was an escape of fluid through the tube which was placed in the cavity, which suggested duodenal contents. She died the fourth day after the operation, from tetanus.

There was much pain and distention of the bowels, suggesting peritonitis. The discharge through the tube on the first day resembled bowel contents, but after that there was a large escape of bile up to the time of death.

CASE V.—A man of sixty-two. One year before entering hospital he began to have icterus, with “flashes of pain” in the region of the umbilicus. During the three weeks before he came to the hospital he had about a dozen sharp attacks of pain in the right hypochondrium, each one of which lasted from five to six hours. His stools during this time became very white (clay-colored), and the jaundice at the time of entrance was extreme.

Examination showed an irregular extent of resistance below the liver, not easily defined through a stiff and rigid abdominal wall. There was tenderness in this region. The urine was dark, with a specific gravity of 1.011. It contained some granular casts, stained with bile pigment. Operation July 23, 1892. The omentum was found adherent to the parts about the gall bladder, which was much shrunken, and lay far under the liver. It was opened, and many small stones were removed. The cystic duct was impervious to a fine probe. A farther search was made, as what had been found up to this time did not account for the jaundice, and a large stone was felt in the hepatic duct well back in the liver. With much difficulty an opening was finally made into this duct, and the finger was introduced. The stone could be felt, but it was very difficult to catch it, as it escaped out of reach into the much dilated hepatic duct each time that an effort was made to seize it. Finally it was caught with forceps, and broke in the effort to extract it. The pieces, as far as possible, were washed out. Both the gall bladder and the hepatic duct were drained by tubes, and gauze was packed around them close down to the opening.

He made a slow recovery, there being much trouble from pro-

trusion of a portion of the transverse colon through the wound. This was finally, however, controlled; and on August 17 his stools began to have a little color. From this time he recovered rapidly, and was discharged early in September entirely well.

CASE VI.—Male, aged seventy-two, entered the Massachusetts General Hospital July 29, 1892. His illness began two years before, with an intermittent, dull pain in the hepatic region. Later, gastric distress after eating appeared, with great loss of strength. Soon this epigastric pain became quite severe, and was followed by vomiting. The vomitus was often streaked with dark matter. Since April of this year he had had frequent attacks of abdominal distension, relieved by belching of wind and vomiting. He lost about fifty-seven pounds weight. Three weeks before entrance a yellowness of the skin was noticed, and in three days he had become intensely jaundiced, which condition continued; he was very much troubled by pruritus, and the stools were clay-colored. There was constant tenderness and pain in the hepatic region, and immediately after taking food. He had in addition a sharp epigastric pain, which was usually relieved by vomiting. On examination the liver was found to be somewhat enlarged, but no defined tumor could be made out. Although it was felt to be a case of probable malignant disease, an exploratory operation was advised, and this was done on August 4. The usual incision was made, and after separating some adhesions the gall bladder was readily found. It was examined externally first without anything being discovered. An opening was then made into it, and the interior of it and of the duct was thoroughly explored, but no stone could be found. There was a nodular feeling at the lower part of the gall bladder, and one or two little masses could be felt outside of it and in the loose tissues about. A tube was placed in the gall bladder and the wound was closed. Everything went well in relation to the wound, yet the patient continued to have pain and difficulty in keeping down any food, steadily lost strength, presently developed a persistent hicough, and died August 14.

CASE VII.—Female, aged forty, entered the Massachusetts Gen-

eral Hospital July 27, 1892. For three years she had been subject to attacks of pain in the region of the liver, these attacks being accompanied by jaundice. For two years she had an attack about once a fortnight, and, latterly, these attacks had come very frequently, there having been three during the fortnight before entrance. Her attacks were frequently accompanied by vomiting and always by rise of temperature. After her entrance into the hospital the attack with which she entered subsided. On August 1, the operation being delayed while waiting for an instrument, she gradually got better, and by August 10 the icterus had almost wholly disappeared. It being thought that these attacks were due to a stone in the gall bladder, it was deemed wise to operate between the attacks. This was done on August 11.

The incision was made in the usual place. The gall bladder was found shrunken. Nothing could be felt in it, and on opening it a few little disintegrated portions of what appeared to have been a stone, were found. No stone of any size could be felt in any of the ducts. A drainage tube was placed in the gall bladder, and the wound was closed down to the tube. She made a good recovery from this operation, but her convalescence was considerably retarded by bronchitis, with dullness at the base of one lung.

CASE VIII.—A spare woman, fifty-nine years of age, entered the Massachusetts General Hospital August 9, 1892, with the following history:

Twenty-five years before she had an attack of hepatic colic. Since then, at intervals, she had had numerous similar attacks. Two months ago a severe attack began, accompanied at first by vomiting, later with chills and considerable fever. Since then she had had a steady, dull pain in the right hypochondrium and back. She was somewhat jaundiced at first, but this had gradually disappeared, the stools being now of a good color. The temperature, however, and pain persisted. It was deemed wise to operate. There was slight tenderness felt in the right hypochondrium, with some resistance, but nothing definite could be made out. The operation was done on

August 10 with the usual incision. The gall bladder was found nearer the middle line of the abdomen than usual. It was much shrunken. It was incised, and about forty small stones were removed from it. The cystic duct was found to be impervious just at its exit from the gall bladder. In the cystic duct just beyond, pressing against its junction with the hepatic duct, was another stone, larger than any of those just removed. With the sharp hook the duct was opened down onto this stone and it removed. This operation with the hook was very easy. The opening into the gall bladder was then sewed up, and a tube was introduced into the cavity from which this last stone was removed. Gauze was packed around this and the abdominal wound was closed down onto the tube and gauze.

On the next morning the patient's temperature had fallen to normal, and she made a good recovery, somewhat prolonged owing to a persistent bronchitis.

In most of these cases, as will be seen, the gall bladder was shrunken, and could not be felt before the operation. The decision for, or against, interference had to be made from the symptoms, therefore, unaided by physical signs.

The author remarks that, judging from the cases that he has operated upon, and from those of which he has had knowledge, it makes less difference than one would suppose, whether the gall bladder is drawn up and stitched to the abdominal wall or not.

If adequate drainage is provided for the bile, the cases in which openings are made into the deep-lying ducts do well, and the bile does not exert any very irritating action upon the peritonæum with which it comes in contact. When, however, the gall bladder can be drawn up to the surface, it is well to stitch the opening into the wound and thus shut it off from the peritoneal cavity. When this is done, he thinks it important to sew the gall bladder to the parietal peritonæum rather than to the skin. In this way there is less liability to the formation of a persistent fistula: for if there is a deep wound through the abdominal wall above the wound in the gall bladder, there is a better chance for granulations to close across the

opening than there is when the edges of the gall bladder are drawn up to the edge of the skin, as in this way the surface from which granulations can grow is much curtailed.

In these cases he has always followed the rule of providing drainage for the gall bladder, and has not attempted to at once close the wound in its wall by suture.—*Boston Medical and Surgical Journal*, December 8, 1892.

### V. Multiple Echinococci in the Abdominal Cavity.

By Dr. A. WESTHOFF (Greifswald). Two of the seven cases observed at the clinic are of considerable interest. The first, a laborer, had a large echinococcus cyst of the right lobe of the liver, which had been evacuated by a transverse incision below the costal arch. After two months' treatment by drainage he was discharged with a fistula, and was readmitted to the hospital six months later. The fistula still persisted, and it had discharged vesicles shortly before his readmission. There was now present a marked enlargement of the left lobe, but no tumor could be made out. The abdomen was opened in the linea alba and the liver was found greatly swollen and oedematous. Elastic tension at one place suggested, however, the existence of a parenchymatous cyst of the liver, and a portion of the processus ensiformis was resected to allow this spot to be brought up and sutured in the abdominal wound. A few days later exploratory puncture revealed pus at a considerable depth and the liver tissue was cut into with a Paquelin cautery knife until a large suppurating echinococcus cyst was opened. This was drained, and the cavity was completely closed by the end of three months.

The second case was a farmer, aged forty years, who suffered from continual and obstinate constipation. His stomach was much swollen and painful; he had intense headache and anorexia, and his general condition had greatly deteriorated. His symptoms only dated back about three weeks. After evacuation of the bowels, the abdomen being less distended, a large tumor could be felt both below the left lobe of the liver and behind the symphysis, and the diagnosis of multiple echinococci cysts was made some days later, when some

vesicles were found in the evacuation from his bowels. After a very thorough evacuation of the bowels another tumor was made out rising from the pelvis and projecting behind the symphysis. This was felt by rectum and filled the whole pelvis. On opening the peritonæum a large cystic tumor was seen rising from behind the symphysis. On introducing the hand into the abdomen a second very movable tumor was felt, which proved to be a cyst of the omentum of the size of a goose egg. This was extirpated by removing the neighboring omentum, and then another cystic tumor in the left lobe of the liver became evident. The peritonæum and skin over the lower cyst were then united and the cyst fastened in the wound, which was then lightly tamponed with gauze and another incision was made through the abdomen over the liver cyst, and this was treated in the same way as the first. After eight days the cysts were opened and the limpid contents (with numerous daughter cysts) having been evacuated, the sac was removed in toto from both cavities and both wounds were thoroughly drained. Both wounds cicatrized properly.

There was in both these cases a number of large and fully isolated cysts developed in various places or in different organs of the abdomen. This multiple inoculation may be explained by absorption by the vena portæ of the organism from the intestine; about one-half of all human echinococci are found in the liver. Another mode of admission is through the lymph channels, and the embryo passes hence through the ductus thoracicus and the jugular vein into the right heart, from where it may go to set up a primary echinococcus of the lung. It may also be carried on into the left heart and from there be spread broadcast through the whole body. When the echinococci stop in the mesenteric glands they either develop a mesenteric echinococcus or a primary peritoneal echinococcus through the communication of the lymph vessels with the peritonæum. Many cases of the spontaneous rupture of the cyst following traumatism with general infection of cysts over the whole peritonæum having been reported, it is generally considered better surgery to do a laparotomy than to make a diagnostic puncture of the cyst.

SAMUEL LLOYD (New York).



## GENITO-URINARY ORGANS.

**Report of Cases of Operations on the Kidney.** By Dr. HERMAN MYNTER (Buffalo). The author reports eleven operations on the kidney, two of them having been done on one patient. These include one nephrolithotomy, three nephrorraphies for floating kidneys, two nephrotomies for pyonephrosis, two nephrectomies, one for sarcoma of the kidney, one for tuberculosis of the kidney, one nephrotomy for a crushed kidney, and lastly one operation done for supposed cholelithiasis in which a floating kidney was found. Ten of the eleven cases recovered from the operation, although all of them died four weeks later of pneumonia. One nephrectomy resulted in death from suppression of urine. The following are abstracts of the cases:

CASE I.—*Nephrorraphy for Floating Kidney.*—Female, aged fifty-one years. When eighteen years of age she noticed pain in the region of the right kidney. Nevertheless, she had no distressing symptoms till within three years when the pain increased and became more or less permanent. At the same time she commenced to complain of dysuria and, occasionally, of bloody urine. During the last year she had complained of dyspeptic phenomena, had become extremely nervous and hysterical, so much so that her family considered her insane, and avoided her as much as possible. At the examination she looked thin, emaciated, and presented many symptoms of acute melancholia. She complained especially of pain over the right inguinal region. An oval tumor with all the characteristics of the kidney was felt here. It was very movable, could be grabbed through the thin abdominal wall, and moved up and down and in and out. The urine was normal and the examination gave otherwise negative result. December 24, 1890, nephrorraphy was done by the usual oblique incision along the outer margin of the quadratus lumborum muscle, the kidney was found very movable, moving up and down during respiration. Palpation did not show anything abnormal. The fibrous capsule was opened behind and stripped off for about two square inches, and the kidney fastened by four silkworm gut sutures.

two on each side, which passed deeply through the kidney substance, the fibrous capsule and the fascia and muscles. The wound was packed with iodoform gauze down to the kidney itself. The first dressing was allowed to remain in place for fourteen days, and the wound was thereafter dressed in a similar way once a week. She was kept in bed six weeks, and then left the hospital with the wound healed. The kidney was then immovably fixed to the posterior wall. She was a great deal less tender from pressure: she had gained in weight, but her hysterical symptoms had not improved. No after record.

CASE II.—*Nephrorraphy for Floating Kidney*.—Female, aged thirty-nine. She had complained of pain in the right side for four years, occurring after confinement. The pain was steady and the whole region so tender that she could not stand the slightest pressure, and no examination could be made. The pain was accompanied with a severe dragging feeling, and was increased by the slightest exertion. Her general health had commenced to suffer: she was thin, extremely nervous, complained of insomnia and inability to do anything whatever. Menstruation was regular: walking almost impossible on account of pain. Under narcosis a prolapsed and movable kidney in the tender region was discovered. Nephrorraphy was performed on August 6, 1892, in a similar way to first case, only that the fibrous capsule was stripped off from the whole posterior surface, and that six kangaroo tendons were used as sutures.

The after-treatment was the same, and she left for her home in eight weeks. She had gained some in weight, could sleep better, and was less nervous and hysterical, had a good deal less pain, and could stand considerable pressure in the right inguinal region. Nevertheless, she still complains of sleeplessness, and has some tenderness in the region.

CASE III.—*Nephrorraphy for Floating Kidney*.—Male, aged thirty-two. He had for seven years complained of indigestion. Two years ago, while lifting a heavy weight, he felt "something give away," had considerable pain, but did not pay any particular atten-

tion to it till six months ago, when he felt a tumor in the right side of the abdomen. During the year previously, he had complained of a dull, heavy feeling in the right inguinal region; occasionally in the left inguinal region, too. During the same time his family observed increasing nervousness and irritability, verging on insanity; he was fretful, peevish, lost in health and weight, and was unable to work. By examination, a tender and movable lump was felt in the right inguinal region, having all the characteristics of the kidney. Left kidney was also prolapsed, although not in so high degree, and was somewhat tender.

September 8, 1892, nephrorraphy on right kidney, which was fastened to the posterior wall by six kangaroo tendons, the fibrous capsule having first been stripped off. It was quite difficult to find the kidney and bring it up into the wound, it having fallen far into the abdominal cavity.

The after-treatment was conducted on similar lines as in the other two cases. He was kept in bed eight weeks; the wound is healed, the tenderness considerably decreased, the appetite good, the weight increased, but he is still peevish, fretful and hypochondriac, and spends most of his time in bed. Time alone will show whether the operation will benefit him permanently or not.

CASE IV.—*Nephrotomy for Pyonephrosis*.—Female, aged thirty-five. She had for about one year complained of severe pain in the right lumbar region, coming on periodically every ten or fourteen days. The pain would occur on rising in the morning, and last till about noon, when she would pass a large amount of urine and pus with immediate relief. She would then feel well for a week or two, when a similar attack would occur. Half a year ago a tumor was discovered in the right lumbar region. It was at the examination of the size of the head of a man, filling out the whole space between the ribs and the ilium, and extending forward to the outer margin of the rectus muscle. A distinct deep fluctuation could be felt both anteriorly and posteriorly. The urine contained considerable pus.

On December 12, 1890, nephrotomy—a puncture with a hypodermic needle having previously revealed pus. The incision was made along the outer margin of the quadratus lumborum muscle, the kidney opened, and about three pints of pure yellow pus removed. The interior of the kidney felt like one large pus sac, and no kidney tissue could be felt.

The cavity was irrigated with corrosive sublimate, the sac stitched to the skin, two large drainage tubes introduced, and antiseptic dressings applied. The sac contracted rapidly, and the patient left on January 6, 1891, with the wound almost healed, except a very small fistule through which a little pus was discharged. No subsequent report.

CASE V.—*Nephrotomy for Pyonephrosis*.—Male, aged thirty-seven. He had emaciated steadily for two years and complained of frequent urination. He knows of no cause; had received no injury. A large fluctuating swelling was felt over the left kidney, very similar to that of the previous case. The urine contained a large amount of pus. By posterior incision one quart of pus was evacuated, the cavity drained and irrigated. He left the hospital greatly improved in six weeks, but with a fistule discharging some pus. No subsequent report.

CASE VI.—*Nephrolithotomy*.—Female, aged forty-five years. Had complained for two years of dysuria, with bloody urine and pain in left lumbar region. The pain increased gradually, so that she was confined to her bed and had to use morphine continually. In January, 1879, a tumor was discovered in the left lumbar region. It was punctured in March, 1879, and four ounces of pus evacuated. The swelling increased again and perforated at the point of puncture, leaving a fistule behind, through which stones were occasionally discharged. The urine contained considerable pus. The operation was done on December 31, 1879. To give room, two inches of the eleventh rib were resected, but all the tissues were changed into a fibrous, almost cartilaginous, unyielding tissue, and no trace was left of the normal anatomy. The kidney could not be distinguished as such, the margin

of the quadratus lumborum being the only thing that could positively be recognized. A number of stones were removed from a cavity in the supposed kidney, but nephrectomy had to be given up. She died four weeks later of pneumonia. Even at the postmortem it was found impossible to separate the kidney. It was intimately connected with the pancreas and colon descendens, as large as a fist, and contained a great number of cavities filled with pus and stones.

CASE VII.—*Nephrectomy*.—Female, aged fifty-three years. She fell down stairs three years ago; one month later she commenced to complain of pain in the left lumbar region, extending down into the thigh, and bloody urine. The pain and bleeding had since recurred periodically, especially when she walked around. Occasionally she had passed clotted blood and had then a good deal of dysuria. At present she complained of a deep-seated, boring and gnawing pain in the left lumbar region, and of frequent micturition of bloody urine with a great deal of dysuria. A large movable tumor could be felt in the left lumbar region, extending forward almost to the outer margin of the rectus muscle; the tumor felt hard and solid. She had lately commenced to lose flesh, and had a slight yellowish color of the skin. The amount of urine for three days averaged sixty ounces, containing considerable blood and traces of albumen.

October 17, 1892, nephrectomy by König's lumbo-abdominal incision, being a longitudinal incision along the margin of the quadratus lumborum muscle, and curving forward from its lower end along the crista ilei well toward the outer margin of the rectus muscle. Without much difficulty the large tumor was isolated, separated and brought up into the wound. The pedicle was perforated from behind with a blunt aneurism needle near the kidney and doubly ligated with chromated catgut. As additional security, a pair of large curved forceps were applied outside the ligature, and the kidney then removed. The enormous wound was plugged with eighteen yards of iodoform gauze strips, and the incisions, except two inches behind, closed with sutures.

The farther result was extremely favorable; the temperature rose once to  $102^{\circ}$ , but was normal from the fifth day. The amount of urine on first and second days was ten ounces to sixteen ounces; third day, possibly on account of the use of digitalis, sixty ounces, and since that time about sixty ounces every day; the urine became in a few days normal. The wound healed kindly, and the patient left the hospital in four weeks recovered.

Subsequent microscopic examination of the tumor showed it to be a small round-celled sarcoma.

CASE VIII.—*Nephrectomy following Nephrotomy*.—Female, aged twenty-four years. Had for several years complained of pains in left lumbar region. The attacks became more and more frequent, and, at last, almost continuous. During the last half-year she had had painful and frequent micturition. The urine contained a great amount of pus, but was at times almost clear. By the examination a tumor was felt at the left kidney, very sensitive to pressure. The kidney could be felt by bi-manual examination, generally enlarged, and could be easily palpated through the lumbar region.

An explorative incision was made in February, 1891, and about two ounces of pus removed from the pelvis of the left kidney. The wound did not heal, and took on a tuberculous appearance, but the pain was very much relieved, as was the dysuria. Ten weeks later, in May, 1891, the kidney was removed by nephrectomy and found to be tuberculous throughout. Total suppression of urine followed, and she died of uremia four days later. Post-mortem examination was made, but so late that nothing could be decided in regard to the other kidney.

CASE IX.—*Nephrotomy for Crushed Kidney*.—Male, aged twenty-two. Four days previously, had been caught obliquely between the bumpers while coupling cars. He was able to travel thirty miles after the accident, but complained then of faintness, pain, vomiting and dysuria. The urine contained a good deal of blood, tympanites supervened, and the temperature increased. At the exam-

ination profuse ecchymosis was seen around the anus and perineum, the urine was of dark, dirty color, intensely mixed with blood; a fullness and diffuse ecchymosis were seen in the right lumbar region. As the diagnosis of crushed kidney seemed evident, the patient was removed to Buffalo the same night, and nephrotomy performed right away on his arrival. The kidney was found lying in a large cavity filled with blood and urine, and the lower half was crushed to a pulp. The bleeding was so copious that nephrectomy could not be done; the whole cavity was plugged with iodoform gauze. The urine passed for a time through the wound, the crushed parts came away by irrigation, and he left the hospital recovered in eight weeks. He was killed on the same railroad half a year later.

CASE X.—*Exploratory Operation for Floating Kidney.*—Female, aged forty-five. Had for six months complained of severe pain one and a half inches to the right of the ensiform cartilage. The pain would come periodically, and be attended with yellow color of skin and conjunctivæ and clay-formed stools. Five weeks previous to her entrance in the hospital she had symptoms indicating peritonitis, followed by a very severe attack of pain and jaundice, lasting four days. She felt then a lump in the right hypochondriac region of the size of an egg, and corresponding to the gall bladder. She entered in order to have a cholecystotomy performed, it being supposed from the history and symptoms that she suffered from gall-stone colic. Over the region of the gall bladder a pear-formed, nodulated, apparently immovable tumor was felt, which had all the appearances of an indurated gall bladder filled with gall stones.

An exploratory incision was made in September, 1892, along the right margin of the rectus muscle, but on entering the abdominal cavity no tumor was found, and even the gall bladder was absent. A hard lump was felt behind the colon transversum. An opening having been torn through the mesentery of the colon transversum, it was found to be a floating kidney. The wound was, therefore, closed, and the patient left the hospital in two weeks. She has felt well since, and so far had no attacks.—*Buffalo Medical and Surgical Journal*, January, 1893.

**The Curative Action of Minor Operations in Renal Affections.** By Dr. OSCAR BLOCH (Copenhagen). The writer describes three cases where exploratory incision was made in order to clear up the diagnosis of obscure renal conditions, and where a minor surgical procedure was also done, as the separation of adhesions, binding the fibrous capsule to its fatty investment, incision of the renal tissue, which was apparently cystically degenerated, cross section of cicatricial tissue, extending down into the substance of the kidney and resembling an old infarct. All these procedures, to which were added puncture with a moderately large needle, have been without injury to the patient. Two of the patients were apparently definitely cured, the one with perinephritic adhesions being seen about two years after the operation and the other nine months after, while the third, apparently suffering from stone in the kidney, though no stone could be found, was only three months under observation since the operation. One patient, in whom there were numerous symptoms, was relieved of them by the operative measure. Here a psychic influence is undoubted. The second, who presented the signs of pyelitis and nephrolithiasis, together with a multitude of nervous symptoms, was not only relieved of her nervousness, but also of the kidney disease. In this case punctures were made and the capsule accidentally bursted, which undoubtedly improved the renal circulation and relieved the tension. The third patient, in which case the cicatricial tissue was split by a crucial incision, was relieved, and if it continues to be definitive the pains must have been due to incarceration of the ends of the nerves in the cicatrix. In all three the effect of the operation was that of a powerful revulsive, and though one cannot explain the action of revulsives, yet one must acknowledge their powerful influence. The writer places great weight on the psychic influence of an exploratory incision in obscure kidney diseases of a surgical nature, and here sometimes one may expect great results from small, slight surgical procedures, which are of no danger to the patient.—*Hospitals Tidende*, No. 1, 1892.

FRANK H. PRITCHARD (Norwalk, Ohio).



## BONES.

**A Case of Multiple Exostoses.** By Dr. O. DIGE (Skive, Denmark). A young boy, fourteen years old, who had always been healthy and never had rachitis, presented a remarkable example of multiple exostoses. There was no hereditary predisposition to the development of the affection in the family and they were ascribed to a severe cold. They were first noticed when the child was one year old and at the wrist and finger joints. Their growth had been slow and attended by no pain. As a rule they were half-spherical, and only rarely pointed. There were exostoses at the ends of the clavicles, the sternum, on the ribs, the scapula, on the extremities, at the epiphyseal lines. The left internal condyle of the humerus presented a growth of the size of a walnut, the fingers were full of exostoses, and the lower extremities were the worst implicated. The internal condyle of the femur had one as large as a walnut, the internal condyle of the tibia a slightly smaller one; on the anterior portion of the right tibia another of the same size, and on the internal malleoli was one as large as a hazelnut. The left lower extremity presented at the external condyles one of the size of a hazelnut, and one on the internal condyle. Both malleoli were hypertrophic, uneven and nodular. —*Hospitals Tidende*, No. 40, 1892.

FRANK H. PRITCHARD (Norwalk, Ohio).

## REVIEWS OF BOOKS.

LEHREBUCH DER FRACTUREN UND LUXATIONEN FÜR ÄRZTE UND  
STUDIERENDE. VON DR. ALBERT HOFFA, Priv. Docent, Uni-  
versität Würzburg. Städtischen Universitäts Buchhandlung.  
TEXT-BOOK ON FRACTURES AND DISLOCATIONS.

IN the somewhat over 700 pages set before the reader, the author has succeeded in supplying a work eminently practical in its nature—a work dealing in the simplest manner, not with the therapeutics alone, but giving a proportionate consideration to the pathological anatomy and the differential diagnosis of the simulating conditions as they present themselves.

In the preparation of this, the second edition, the scope of the work has not only been enlarged, but the author has added forty-nine new figures, making 374 illustrations, and twenty-nine colored plates.

In the selection of the figures he acknowledges his indebtedness for many of the same borrowed from Gurlt and various text-books.

The differential diagnosis of simulating conditions has received a careful consideration, and here again he is indebted to others for valuable additions.

The pages touching upon fractures of the skull form a strikingly clear exposition of the whole subject.

In speaking of the production of fractures of the base he passes with a few words upon those produced by direct violence to the much larger class dependent upon indirect violence, either by force conveyed through “impressions,” or those produced by a combined process of “bending and bursting.”

Under the first of these mention is made of those produced by a fall upon the head in which force is transmitted in a vertical axis, driving the base against the spine, with the production of a similar fracture and the tendency of a wedging in of the latter; or by a fall

upon the feet or pelvis, in which the force is transmitted through the spine after the fashion which the workman employs in tightening the handle of his tool by striking the end of the same against some resisting surface.

Before passing to those produced by a combined "bending and bursting," attention is given to those dependent upon *contre coup* and irradiation.

Speaking of the former, he reviews Gancerotti's vibration theory, and illustrates this in a few words with the case of President Lincoln, in which the ball entered on the left side of the occipital bone, passing to the right anterior lobe of cerebrum, with the fracture of the right orbital plate.

As to the latter, reference is made of Aran's law of irradiation, in which the fracture starts at the point of impression, traveling to the base by the shortest route.

Passing to the last the author, accepting the demonstrations of Bruns and Messerer of the comparative strengths and elasticity of the vault and base, reviews the experiments of von Wahl, Herman and others, in which it is shown that many of these rest upon a well-defined physical law, *i. e.*, when the force applied to a hollow globe overcomes the elasticity bursting occurs, and this naturally at the point of least resistance: now, since the base is not only the weakest but also the most inelastic, this is the first to give way.

In these he also points out that this fact is not without its medico-legal significance, in that the line of fracture always parallels the line of force.

In treating upon the shoulder joint, he has arranged the differential diagnostic points of the following:

(1) Contusion of the shoulder-joint; (2) supra-acromial luxation of the clavicle; (3) infra-acromial luxation of the clavicle; (4) fracture of the acromion; (5) fracture of the head of scapula; (6) subcoracoid luxation of humerus; (7) fracture of head of humerus; (8) trans-tubercular fracture of humerus; (9) fracture of greater tuberosity; (10) fracture of greater tuberosity with subcoracoid luxa-

tion of humerus: (11) fracture of lesser tuberosity; (12) fracture of anatomical neck of humerus: (13) fracture of surgical neck of humerus: (14) fracture of anatomical and surgical neck of humerus, with subcoracoid luxation: (15) fracture of epiphysis.

These are each considered in the following manner: (1) age; (2) manner of production: (3) appearance of shoulder: (4) acromion and deltoid: (5) soft parts beneath the acromion: (6) existence of elevations and depressions: (7) presence of pain at particular spots: (8) the axis of the upper arm: (9) position of the arm: (10) length: (11) function: (12) position of joint or fracture; (13) elicitation of crepitus: (14) preternatural mobility and rigidity: (15) possibility of reduction.

We note in addition a similar, but not as extended an arrangement in other joints, as the elbow, hip, etc.

In dislocations about the hip he gives place, principally, to Kocher's method by manipulation, and to Middledorpp's "*Methodus Mochlica*." Should these fail, arthrotomy under aseptic conditions is in order.

Should the luxation be complicated with a fracture of the neck, and its reduction be impossible, even after arthrotomy, primary resection, with the endeavor to form a new joint, should be attempted.

In old dislocations a careful attempt by Middledorpp's method should be made. Should this fail, farther force should be discouraged and then subtrochanteric osteotomy attempted, or in stubborn cases resection of the head, which has already been carried out in fifteen instances, is to be considered as a last resort.

In fractures of the patella he gives the indications in the treatment as: (1) removal of the articular effusion: (2) coaptation of fragments: (3) retention of fragments until consolidation: (4) overcoming quadriceps atrophy: (5) re-establishment of the functions of the joint.

Three methods of treatment are outlined—position, immobilization and the employment of suitable appliances: (2) massage: (3) operative treatment.

Fibrous union is the result in all but the sub-aponeurotic variety, and in the latter, as well as in those subjected to the operative method, bony union is the rule.

He emphasizes the suggestion of Macewen, that the lack of bony union is nearly always dependent upon the overlapping of the aponeurotic fringe.

In the treatment his remarks bear a notable savor of conservatism in that he is inclined to put the operative treatment decidedly in the background, even where antisepsis can be carried out.

We have noticed, here and there, a few minor discrepancies, e. g., the omission of Fig. 101, on page 469; Fig. 236 is referred to as Fig. 237; again on page 545 we see Fig. 266, which evidently should read 296; but these are minor defects, hardly to be avoided, and which do not detract from its practical value.

The work, on the whole, furnishes a clear, distinct and thorough *exposé* of the subject with which it deals and from which the reader can gain such information as may be needed in moulding his course of action.

AUG. SCHACHNER.

TRANSACTIONS OF THE AMERICAN SURGICAL ASSOCIATION, 1892.

Edited by J. EWING MEARS, M.D., Recorder of the Association. Philadelphia: William J. Dornan. Vol. X., pp. xxii.—280.

This volume sustains the high standard from a scientific standpoint set in previous years by the publications of the Association. The majority of the papers, having already appeared in this Journal, are familiar to the subscribers and require no comment from the reviewer. But the index offers a great deal to interest the student of surgery. The index accompanying this volume is complete for all the published work of the Association from 1883 to 1892 inclusive, and as an indication of the development and advancement of surgery in this country is of great value. In glancing through this tabular statement of the ten years' work one is struck by the changes in the management of

wounds: thus in the earlier volumes Listerism is the topic under discussion: then follows a series of papers on antiseptic surgery, until finally, in the later volumes, asepsis seems to be crowding out the antiseptics. So, too, the changes in abdominal and cranial surgery are marked. It is not until the eighth volume that the appendix appears on the scene, and only two years before, Volume VI, they were still discussing typhlitis and peri-typhlitis. Only five years ago, Volume V, the question was asked, "should laparotomy be done for penetrating gunshot wounds of the abdomen involving the viscera?" while it is only in the last few volumes that one realizes the amount of attention that is now being devoted to the region of the liver and gall bladder.

These volumes are in reality an encyclopædia of surgery of the greatest value, both practically and historically, for the articles are written by men who are fully abreast of the times, each an authority for his section of the country, and are discussed by his peers in surgical acumen and experience.

These volumes are also of interest to those who care for the study of the men who go to make up the surgical history of the country. In this Association are banded together not only the most prominent men of the present, but its roll has borne the names of nearly all the great surgeons of the past decade, and some record of their best work is included in the pages of the Transactions.

SAMUEL LLOYD.

## NECROLOGY.

### BERIAH ANDREW WATSON.

BERIAH A. WATSON was born on a farm near Lake George, on the 26th of March, 1836. He was the third son of Perry and Marion Watson. At an early age he was sent to the district school, where he acquired, in connection with a judicious course of outside reading, a good elementary education. He soon became a member of the family of Jonathan Streeter, a Quaker teacher of that locality, where broader opportunities were afforded to pursue a higher course of education. After two or three years he taught school, and thereby acquired sufficient means to farther prosecute his studies. He attended later the State Normal School at Albany, where he secured an academic education. At the age of twenty-one he took up a preliminary course of medical reading in the office of the late Dr. James Reilly, at Succasunna, N. J.

In the fall of 1859 he matriculated in the medical department of the New York University. He graduated in the spring of 1861. After receiving his degree he located at White House, N. J. When the Civil War broke out he entered the United States service, having passed the examining board of which Valentine Mott was president. He was assigned a position at the Army Hospital at Newark, where he remained until the 26th of March, 1863. He was then commissioned assistant surgeon Fourth New Jersey Volunteers. He was later placed in charge of the Fourth Artillery Brigade, at Falmouth, Va. After the battle of Gettysburg he was commissioned surgeon with rank of major. Soon after this he was detailed operating surgeon of the First Brigade, First Division, Sixth Army Corps, and was subsequently ordered to take charge of the hospital of this Division. He was also made acting medical purveyor of the corps. He returned to civil life in July, 1865, and resumed the practice of medicine, locating in Jersey City, N. J., where he soon acquired a large practice.

Amid the arduous labors of his profession he found time for study and literary work. An act legalizing dissections of human cadavers in New Jersey was passed and secured mainly through the efforts of Dr. Watson and Dr. J. D. McGill. Dr. Watson was instrumental in the formation of the New Jersey Academy of Medicine. He was also one of the organizers of the Jersey City Hospital, and received the appointment of attending surgeon in 1869. In 1873 he was appointed attending surgeon to St. Francis Hospital, and later to Christ Hospital. He was also consulting surgeon to the Bayonne Hospital. Dr. Watson's contributions to medical literature have been extensive and important, among which may be mentioned the following :

"A Case of Facial Neuralgia Treated by Extirpation of the Superior Maxillary Nerve" (reprinted from *Medical Record*, October 16, 1871).

"A Case of Hematoma of the Thigh: Two Operations: Death" (*Medical Record*, October 20, 1875).

"The Pathology and Treatment of Chronic Ulcers" (*New York Medical Journal*, July, 1875).

"Cases of Rabies Canina Treated with Strychnia and Woorara: Recovery" (*American Journal of Medical Sciences*, July, 1876).

"Femoral Aneurism Treated by Plugging the Sac: Death Caused by Hemorrhage from Deep Epigastric Artery on the Eighth Day: Autopsy: Remarks" (*American Journal of Medical Sciences*, October, 1870).

"Stomach Pump, Aspiration and Syringe" (*Medical Record*, Vol. II, p. 805).

"Woorara in Rabies: Report of Two Cases, with Remarks" (*American Journal of Medical Sciences*, Vol. LXXIII, p. 413).

"Liver Exsection Sac" (*Medical Record*, Vol. XIII, 38).

"Discotome" (*Ibid.*, Vol. XIV, p. 78).

"Gunpowder Disfigurements" (*St. Louis Medical and Surgical Journal*, Vol. XXXV, p. 145).

"Pyæmia and Septicæmia" (*New York Medical Journal*, Vol. XXVI, pp. 367-461).



“Disease Germs: Their Origin, Nature and Relation to Wounds” (*Transactions of the American Medical Association*, Vol. XXIX, p. 263).

“An Experimental and Clinical Inquiry into the Etiology and Distinctive Peculiarities of Traumatic Fever” (*Transactions of the American Medical Association*, Vol. XXXII, p. 409, 1891).

“Woorara: Its Medical Properties and Availability for the Treatment of Diseases” (*Virginia Medical Monthly*, Vol. IX, p. 1, *et seq.*

“Lister’s System of Aseptic Wound Treatment *versus* Its Modifications” (*Transactions of American Surgical Association*, Vol. I, p. 205, 1883).

“An Experimental Study of Anaesthetics” (read before the American Surgical Association, at Washington, D. C., April 30, 1884).

He translated several medical essays from the French and German, and published two volumes of note, “Amputations and their Complications” (1885) and “The Sportsman’s Paradise” (1888). He contributed the chapter on “Pyæmia and Septicæmia” in the “American System of Practical Medicine,” edited by William Pepper, M.D., LL.D. (1885), and also a chapter on the “Operative Treatment of the Spleen,” in Keating’s “Diseases of Children.” Among the more recent works are a “History of Surgery” and a brochure on “Experimental Study of Lesions Arising from Severe Concussions.” He left an unfinished work on the “Surgery of the Spine,” which he intended to have finished and published at an early date. It embodies the results of and deductions from experiments on dogs made by the doctor five years ago.

In 1882 Rutgers College conferred upon Dr. Watson the honorary degree of Master of Arts.

The doctor accumulated one of the largest private libraries in the State, and one of the most complete surgical libraries in the world.

Four years ago he took a trip abroad, accompanied by his daughter and niece. His health was very poor, he having been a

sufferer from diabetes for nearly fifteen years. While there he spent the greater part of his time attending clinics and visiting hospitals in all the larger cities of Europe. Dr. Esmarch, the surgeon-general of the Prussian Army, gave a reception in his honor, and Dr. Billroth, of Vienna, was equally demonstrative in his welcome.

Dr. Watson was always an enthusiastic sportsman. He took pleasure in collecting and adorning the walls of his residence with the trophies of his skill. In 1888 he wrote and put to press the admirable volume "*Sportsman's Paradise*."

In mineralogy, too, he took a very deep interest, having collected specimens from all parts of the world.

For the last three years Dr. Watson had been in very ill health, but continued steadily at his work until eight weeks prior to his death. Throughout the latter part of his illness he exhibited the same indomitable will power that has always characterized him. While confined to his room a patient presented himself for examination. The Doctor, realizing the seriousness of the case, advised the woman to be operated upon. She consented upon condition he himself would operate. Accordingly, on the 30th of November, two weeks prior to his death, he arose from the bed to which he had already been confined over a week, and performed a complete amputation of the right breast.

One of the last acts the Doctor performed was the reading of a paper before the New York State Association of Railway Surgeons, at the New York Academy of Medicine, November 14. Subject, "*Expert Examinations and Testimony in Railway Cases*."

His death was the result of exposure and fatigue while in pursuit of game. This sad event occurred Thursday, December 22, 1892.

Dr. Watson was a man of deep thought and great natural ability. He was polite, refined and pleasing in his manner, and a delightful conversationalist. As a military officer he was faithful and conscientious. As a physician and surgeon he was held in the highest estimation. He was a true husband and father, kind and sympathetic in his nature, and always endeavoring to make those around him

happy. Knowing the disease with which he was afflicted to be inevitably fatal, he endeavored to conceal from his family its serious nature.

It was on the 24th of December that the mortal remains of Dr. Watson were conveyed to their last resting-place in Greenwood. When he passed away no class of men felt more severely the loss than the members of the medical profession. He was widely known and universally beloved. His wife and one daughter survive him.

ROY INGLES.

## CORRESPONDENCE.

### MENTAL SYMPTOMS FOLLOWING UPON USE OF CONTINUOUS SUPRA-PUBIC DRAINAGE OF THE BLADDER.

MR. EDITOR: Dr. Wyeth's report of cases in which mental symptoms supervened after all effects of the trauma had subsided in cases of supra-pubic cystotomy, which report appeared in the *ANNALS OF SURGERY* for January, 1893, leads me to report the following case:

Wm. M. German, aged eighty-eight years, had a supra-pubic cystotomy made on September 16, 1892, on account of an enlarged prostate, with chloroform anæsthesia. The record shows that all went well until at the end of two weeks when, with the wound healed up to the catheter which was retained, cerebral symptoms developed which, together with general failure of vital powers, ended in death on October 19, 1892,\* just one month and one day after the operation. There was nothing about the wound or patient denoting uræmia, iodoform poisoning, or sepsis. The cerebral symptoms consisted of delirium, hallucinations, delusions, peevishness, childishness, somnolence and wakefulness, the wakefulness being more marked at the beginning and the somnolence toward the last of the illness. I looked upon these symptoms as due to changes likely to occur in the aged, and in no way related to the operation until I read Dr. Wyeth's report and the discussion upon it, when I concluded it possible that the relation of cause and effect might exist, though I have no explanation for it.

MILES F. PORTER.

*Fort Wayne, Ind.*

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FIG. 1.—Sac dissected and raised from canal to internal opening.

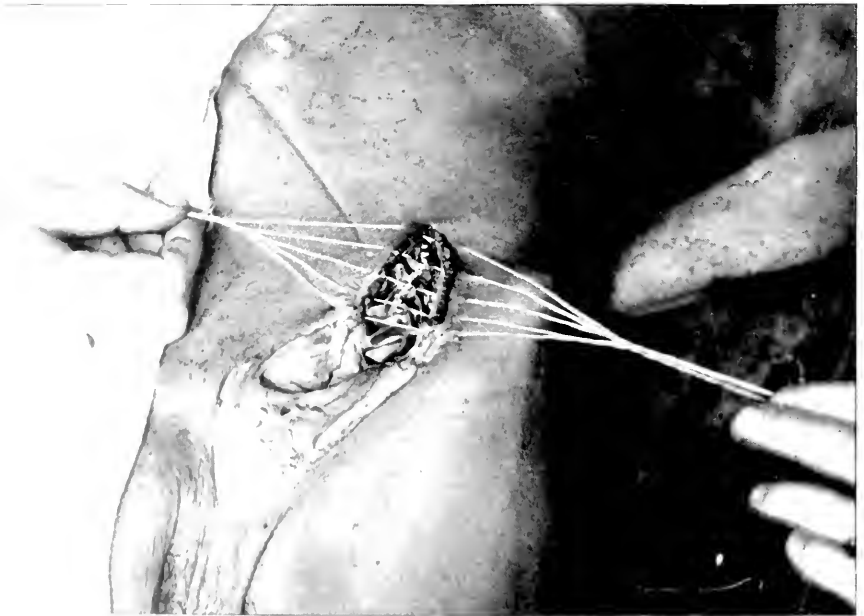


FIG. 2.—Sac introduced into abdominal incision, fixed with deep sutures, cut off and closed with deep suture.

# A PROPOSED NEW METHOD OF OPERATING FOR THE RADICAL CURE OF INGUINAL HERNIA.<sup>1</sup>

By GEORGE A. BAXTER, M.D.,

OF CHATTANOOGA.

PROFESSOR OF SURGERY, CHATTANOOGA MEDICAL COLLEGE.

I DESIRE to present to the Society a new operation for the radical cure of inguinal hernia, and to enumerate a few of what I conceive to be its merits. In doing so, I have no desire to decry any of the open methods now in use, all of which, especially the McBurney, have received well-merited favor from the profession; but simply to add another procedure which I trust may prove useful in dealing with a large class of cases of this otherwise very troublesome affection.

The procedure consists, in brief, in a prolongation of the incision through the internal opening upward, into a more or less extensive laparotomy, as the exigencies of the case may require; dissection of all or a portion of the sac carefully from all its attachments within the canal and at the internal ring; ligation of the sac at some point within the canal; lifting the sac upward into the line of the abdominal incision above the ring and fixing it there, and subsequent closure of the abdominal incision, canal and scrotal incisions after the manner described below by diagram and in detail.

The first part of the incision is made in the usual manner over the tumor. The sac is not now treated differently from usual except that, being dissected out or cut off within the canal after being ligatured, it is not dropped back into the cavity of the abdomen, but carefully retained outside the abdominal wall. The sac is now carefully dissected from around the internal ring and

<sup>1</sup> Read before the Southern Surgical and Gynecological Society at Louisville, Ky., 1892.

slightly separated from its internal border, the latter being freshened and made as free as possible, after which the incision is carried directly upward through the inner opening sufficiently far to enable the sac to be engaged in it without being too much folded upon itself. The advantage of the upward incision is that, whether the hernia be an ordinary oblique inguinal, or a direct inguinal, the deep epigastric artery is avoided. The object in making the incision sufficiently long is to prevent a folding of the sac on itself and thus get a closer and firmer union within the line of the incision with the parietal peritonæum, and a more extensive attachment to the abdominal wall. The next step consists in fixing the sac in the line of the abdominal incision (Fig. 1). This is done by deep suturing carried downward through all the tissues, including the peritonæum on one side, thence through both layers of the sac, and reversed on the opposite side from the abdominal cavity to the integument, which sutures are not yet closed but cut off long and laid back on the surface of the abdomen until all sutures in the abdominal incision are passed. An all-important fact must here not be overlooked, the tendency of these fascia of the abdominal wall, owing to the peculiar direction of their fibres (and, indeed, the same may be said of the muscular tissues as well in this situation, as the incision is outside the rectus muscle), to contract underneath the integument, and the possible failure to properly coapt the different elements of the wall, tissue to tissue, owing to this contraction, without greater traction than is justified in the proper closure of the wound. Hence, an assistant should draw forward these contracting tissues flush with the integument on both sides, both during the passage of these first deep sutures and the subsequent more superficial layer (Fig. 2).

This deep layer of sutures passed, which is intended to approximate the peritonæum and hold the sac in place, the sac is now cut off in the depths of the wound shortly above the peritonæum and closed by a buried absorbent suture and the second set of sutures is passed, an assistant counteracting, as before, the contraction of the tissues from both sides. These go only below the fascial tissues, passing across above the peritonæum and the now closed sac, and are meant to approximate these tissues



fascia to fascia, muscle to muscle, as these fascial tissues, especially the deep fascia, are regarded as the bulwarks against the possibility of ventral hernia; and it is desirable to bring homologous tissues into apposition, as only in this event can the resulting cicatrix be regarded as permanent. One other condition must here be mentioned: unless this tendency of the fascial tissues to contract in different directions and withdraw underneath the skin is carefully watched by the operator and drawn flush by an assistant, who must be certain that every tissue is included in the grasp of his forceps during the passage of both sets of sutures, one or more coverings will fail of complete approximation, and though the wound unite and there be no resulting ventral hernia at the point of incision, the general abdominal wall will be weakened in degree by the resisting force of this non-approximated fascia at one side or other of the incision; and the expulsive force of the abdominal contractions being now taken off the ring entirely and deflected against the abdominal walls, there is likely to be a bulging of these walls at this weak point, and in time a resulting ventral hernia. This protrusion, if it occur, will probably be on the outside of the incision, as here the fascia, being longest, has more room for contraction. This danger, as that of ventral hernia in general, should be avoided by a close attention, in detail, to the rules of closure laid down.

Before the closure of either of these two sets of sutures now passed, and after the cord has been placed to the outer side of the incision in the canal, two curved or crucial sutures (sometimes both may be needed) are passed at the internal opening of the canal from below upward, dipping over the cord but entering and passing through the tissues after the manner in the majority of operations for ruptured perineum—traversing them, in other words. These last sutures should now be closed first, but before being tied they should be drawn together to see that complete and perfect approximation is had at the internal opening in order to permit the passage of a supplemental suture at this point if found necessary in very large openings, while the approximation can be seen from below and above the opening (it can always be seen from below and always felt from above) and, if found to be

complete, they are tied, when the inner opening is found closed upon itself like the inner and middle contracting coats of an artery after ligature. The abdominal wound is now closed, commencing with the deep sutures and followed by the more superficial set—the fascial (Fig. 3).

The hernial canal and scrotal openings are closed with deep suturing. No drainage is used, unless the sac or its contents has been diseased, as complete obliteration of the whole canal is attempted, except the narrow canal through which the cord yet passes.

One other precaution, perhaps, should be given for those not accustomed to this class of operations, the necessity for a careful removal of all fat from the neighborhood of the internal opening and the freshening of the edges of the tissue at this point for better union.

The points of originality claimed in this operation are: A line of incision through the abdominal wall suitable for any inguinal hernia; the attachment of the hernial sac in the line of the abdominal incision above the internal opening diverting the expulsive efforts of the abdominal muscles from the internal ring to the abdominal parietes; and the method of closure of the abdominal wound so as to obviate the danger of ventral hernia, the latter point adapted to the exigencies of this operation from the laparotomists.

Its advantages, briefly enumerated, are considered to be:

(1) It takes only the ordinary time for the closure of any wound to make firm closure of this, as there should be a union by first intention.

(2) It obviates the use of a truss, as the pressure is no longer against the internal ring, and anything in the way of a truss in this situation more than a broad band would do harm instead of good by causing an absorption of the cicatricial tissue.

(3) It deflects all expulsive efforts from the ring and canal to the abdominal parietes, thereby lessening greatly the liability to a recurrence in the old channel; and by so doing leaves the ring and canal in a perfectly quiescent state during the whole progress of healing.

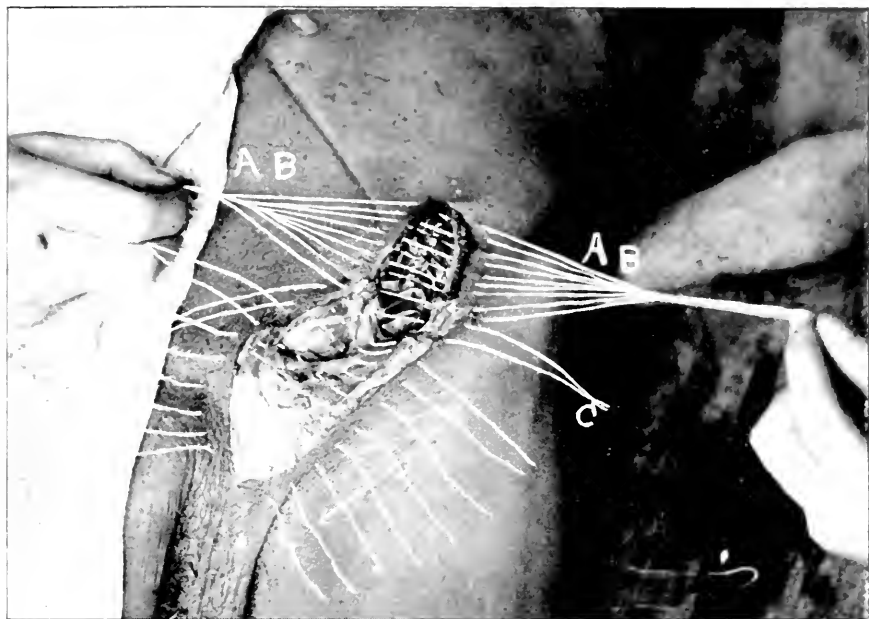


FIG. 3.—AB.—Deep and superficial sutures.  
 C.—Crucial sutures at internal opening.  
 D.—Sutures closing the hernial canal.



FIG. 4.—Result of Baxter's operation for hernia in Dr. A. W. Boyd's case.



(4) It affords a smooth, instead of a pouched covering to the inner ring, which covering has sometimes the advantage of being thickened.

(5) It avoids any necessity for traction on the sac or its contents, hence lessens materially the danger of rupture of sac or contents in diseased condition.

(6) It allows complete excision of sac below the internal ring if advisable in diseased conditions, and affords abundance of room for resection of the gut, if found necessary.

(7) It is applicable to nearly all cases of inguinal hernia, is easy of execution and affords excellent results, fine cicatrix and complete obliteration of the whole canal.

Its two dangers are ventral hernia and pressure over the cord by contraction of cicatrix. The first does not seem to me so great where care is taken to approximate homologous tissues as it is through an imperfectly closed and obliterated ring and canal; or a perfectly closed one, with the changing conditions in its resultant connective tissue cicatrix, at this point, with the constant pressure upon it. The danger from pressure by contraction on the cord is neither greater nor less than it is in any of the open methods which do not, as a part of their procedure, excise the cord and testicle. I present to you, also, a photograph (Fig. 4) of a late result, by this method, operated upon by Dr. A. W. Boyd, of Chattanooga, Tenn. The patient was an old man with a large amount of adipose tissue. Hernia of the direct kind and the size of a child's head, and of many years standing. The canal and openings so large as to make it an impossibility to retain it with a truss. The sac attachments were extensive, but so far as could be ascertained there was no history of strangury at any time. The union here seemed complete, and the man "as well as ever," as he expressed it in two weeks. He was at work as a track hand, hauling rails and ties in a wheelbarrow, in six weeks. In this case the whole expulsive efforts of the abdominal muscles expend themselves to the outside of the incision and above the internal ring.

I realize, of course, my temerity in bringing forward an operation of this character without further practical demonstration

of its effects, and without a longer period of trial of its lasting effects than the reported case gives, but, in a certain sense, it is not an untried experiment, as there is no part of its separate procedures that has not been tried in operations of different character having different objects in view, and its point of weakness, if such exists, would be in a possible failure of proper union of the abdominal parietes, and the laparotomists have demonstrated extensively the issues to be met here, and how to meet them.

# THE ACCIDENTS WHICH MAY FOLLOW REMOVAL OF PORTIONS OF THE OMENTUM IN OPERA- TIONS FOR HERNIA.<sup>1</sup>

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IN reporting the results of 134 operations for the radical cure of hernia to the American Surgical Association, two and a half years ago,<sup>2</sup> I narrated a case which was fatal from septic peritonitis, caused by an elaborate search for a bleeding omental stump from which the ligature slipped before the operation was completed. Of that series of cases 118 operations were performed on adults, and in 40 of them more or less of the omentum was excised. This experience has led me to exercise great care in dealing with this detail of radical cure operations. I have always tied the mass with chain ligatures, each loop embracing no more than a mass of tissue the volume of the finger, and have always used a large-sized silk, for fear that a finer size might cut the thin-walled veins, or that catgut might be absorbed too rapidly. I have, furthermore, bathed the knots in bichloride solution and dusted the raw surface with iodoform. With these precautions I have not met with another case of bleeding in a number of cases almost as large as the above-named.

Another accident has, however, come to my notice, which has not been commented on with the attention it deserves. I refer to inflammation of the stump of the returned omentum with local peritonitis, sometimes resolving, sometimes ending in suppuration with serious symptoms. Dr. W. B. Coley, when house surgeon to the New York Hospital, first called these

<sup>1</sup> A paper read at the meeting of the New York Surgical Society, January 11, 1893. For discussion, see page 321.

<sup>2</sup> Transactions American Surgical Association, Vol. VIII, p. 99.

cases to my notice and commented on them in a report<sup>1</sup> of cases of hernia treated during his service. Of thirty-five operations eleven were complicated with removal of portions of the omentum, and four of these presented evidences of subsequent inflammation of the stump. Three ended in resolution; one went on to suppuration. The features of the resolving cases are illustrated by the following histories:

CASE I.—*Resolving Inflammation of Omental Stump*.—In February, 1890, an irreducible scrotal epiplocele the size of a cocoanut was subjected to operation in a patient aged twenty-one years. Almost the entire omentum was involved and removed. During the fourth week a tumor of about the size of an orange appeared in the epigastric region. This was hard, exquisitely tender and intra-peritoneal. The temperature rose to  $101.5^{\circ}$ , and the pulse became rapid and weak. The tumor increased in size and the symptoms in severity for two or three days, at the end of which time there was a gradual remission, and two weeks later they had entirely disappeared.

CASE II. — *Resolving Inflammation of Omental Stump*. — An irreducible scrotal epiplocele was operated on for radical cure August 27, 1890. Omentum ligated as previously described. Primary union except at site of drain. Discharged in thirty-four days. During the third week there was a mild attack of peritonitis localized on one side of the umbilicus, which receded in a week.

In the third resolving case the inflammation developed after primary union had occurred, about the time (three weeks) when the patient was ready to leave the hospital.

The following case, which suppurred, is noticeable because of the time which elapsed between the operation and the culmination of symptoms which made interference desirable (six months), and, further, from the involvement of the appendix and the effort on the part of nature to remove the stump by absorption, as shown by one apparently resolving attack of local peritonitis occurring between the operation and the final attack.

CASE IV.—*Inflammation of Stump of Omentum Involving the Appendix; Abscess Threatened; Removal; Recovery*.—In February,

<sup>1</sup> New York Medical Journal, April to August, 1891.



1890, for a large irreducible femoral epiplocele of the right side, "radical cure" was attempted. The stump of the omentum was ligated with silk *en masse*, returned, and the sac excised. Primary union followed. He returned in May, three months later, complaining of dull pain in the right iliac region. By careful, deep palpation an indistinct tumor could be felt, apparently in the region of the cæcum. The symptoms were not well marked, and at the end of a week, there being no increase in severity, he was discharged. In August, six months after the operation, he was admitted to the hospital, much debilitated, with a tender tumor the size of a hen's egg deeply seated in the right iliac fossa. After incising the parietes the omental stump of the previous operation was found adherent to the peritonæum lining the iliac fossa. In separating the adhesions a few drops of pus were encountered, and the appendix was found to be glued into the omentum, which was rolled together into a mass as large as an egg. This, with the appendix, was removed, after applying silk ligatures above. The wound healed promptly, but another hard and painful lump appeared beneath in the abdominal cavity, corresponding to the site of the new omental stump. This gradually disappeared in a month under the influence of rest and poultices.

In this instance the debility, loss of flesh, and anæmia were so pronounced on the man's final return to treatment that I should have entertained the diagnosis of a malignant growth had I not been aware of the behavior of the omentum in the other cases.

In fact, in the following case the patient was sent to the hospital with that presumptive diagnosis for observation and possible exploratory incision.

CASE V.—*Abscess of Omental Stump Three Months after Operation; Discharge of Ligature*.—A laborer, aged thirty-five years, underwent Bassini's operation for radical cure of right irreducible inguinal hernia, in June, 1892. A considerable mass of omentum was tied off with silk. Prompt recovery followed. In September, 1892, he was readmitted to the hospital, complaining of pain and tenderness in the right iliac fossa. A hard mass but slightly tender could be felt adherent to the parietes close against Poupart's ligament. Pulse, 100; temperature, 100°. Ordered rest, poultices, and occasionally opium. In course of eighteen days the local and general

symptoms remained stationary though pain continued, when suddenly there was vomiting and temperature of  $103^{\circ}$ , and the tumor became more conspicuous. Incision revealed an abscess containing one pint of pus just beneath the parietes, which were infiltrated, and the original ligature was discharged with the pus. The wound healed promptly.

The knowledge of the above conditions makes an instance of fatal suppurative peritonitis the less surprising. I am permitted to quote it here by the kindness of Dr. Weir, in whose service it occurred. It is to my mind the most instructive case of the series, and one which kept in mind may help all of us to prompt action under similar circumstances, and to possibly better results.

CASE VI.—*Abscess of Omental Stump Ending in Purulent Peritonitis and Death.*—A man, aged thirty-two years, was operated on November 19, 1891, for irreducible scrotal epiplocele, omentum weighing 140 grammes being removed, and the stump ligated in five portions. Primary union resulted. There was no abdominal reaction till the eighth day, then vomiting occurred with pain and tenderness. These persisted but in moderate degree. On the eighteenth day dullness and swelling over the right lower half of abdomen; tympanites on left side. Abdominal section revealed a purulent peritonitis, the coils of small intestine being adherent and an abscess between the stump of omentum and the sigmoid mesentery. Irrigation and drainage. Death in eighteen hours.

This condition of the omentum has been observed by me under other circumstances, which can be briefly told.

CASE VII.<sup>1</sup>—*Resolving Inflammation of Omental Stump after Ovariectomy.*—In the course of an ovariectomy performed March 1, 1890, on a patient fifty-three years of age, a small mass of adherent omentum was tied off from the cyst wall. At the end of two weeks there was a sharp attack of local peritonitis. A hard, tender, intra-peritoneal swelling could be felt three inches above the umbilicus. The general symptoms were not severe and the local inflammation subsided in a week.

CASE VIII.—*Abscess in Omental Stump after Operation for Appendicitis; Recovery.*—A boy of fifteen was operated on for per-

<sup>1</sup> From Dr. Coley's report.

forative appendicitis with pelvic peritonitis on November 15, 1892. The appendix was rolled up in a mass of inflamed omentum which was tied off with catgut in a healthy part, and the stump carefully disinfected. Two weeks later, when the most favorable progress was being made, there was fever, vomiting and pain and tender induration above and to the inner side of the upper angle of the wound, the situation in which the omental stump was left. Two days later a chill occurred, and the swelling became more prominent under the outer edge of the rectus muscle. An incision under chloroform evacuated a half ounce of pure pus, which lay between the intestine adherent to the parietes below and the omentum above. Prompt subsidence of symptoms and recovery followed.

I have no doubt that experiences similar to these have fallen to the lot of others, but I do not remember to have seen them reported.

It seems just to conclude that the explanation of the localized peritonitis is a correct one, even in the cases where it has not been demonstrated by operation. One meets with such intra-peritoneal exudations not infrequently in the vicinity of pedicles of tumors. Under these circumstances the omentum, if it has been left entire, together with coils of intestine, may make up the swelling which is evident on palpation; but when such an inflammatory tumor occurs in the epigastrium after a simple ovariectomy, or in the neighborhood of the situation in which the omentum was adherent at time of the operation, as in the case of appendicitis, there is no other equally rational way of accounting for it. In hernia operations for radical cure the intestine is usually uninjured; the omental stump is the only raw surface left in the cavity. Another point goes to strengthen this view. In Case IV, the first signs of such a tumor were perceived in the epigastrium. They disappeared rapidly, and on the man's return to hospital the tumor was in the ilio-caecal region. The omentum, from its mobility, is more likely than any other viscus to form a tumor in different parts of the abdomen at different times.

In the way of diagnosis such a condition may be taken for an accumulation of feces, and hence not given its proper significance. The facts that it is usually tender, immovable, firm or hard, and

associated with local pain, rise of temperature and vomiting, ought to furnish sufficient distinctive features. Fæcal accumulations are not often met with after abdominal sections except in the rectum. And if in other situations, the soft, doughy, painless tumor, without general symptoms, can usually be displaced by laxatives or enemata.

It is doubtful whether we have any other aid than the history to distinguish between this condition and neoplasms of omentum and intestine: but exploratory incision is justifiable for that purpose, and even desirable.

In reflecting on the possible cause of the reaction in these cases, when many others have presented no similar features, I am in doubt whether to find it in the silk used, or in some defect of asepsis. The facts gathered from my own experience are contradictory. But inasmuch as I have always used silk hitherto, I am disposed in the future to return to catgut, to make the masses of omentum included of *smaller* volume, and to ligate separately all large vessels that may be encountered, and which might bleed if the catgut was too rapidly absorbed. Another step might help to prevent local sepsis in the stump. That is, the cutting of the tissue as close to the ligature as is safe. With small masses embraced in the loops, the end beyond could be left much shorter, and would be less likely to decompose.

Another accident in the management of the omentum in hernia cases I feel obliged to put on record, though I fancy the occurrence is quite unique. It has happened to me to wound the intestine both by tearing and cutting through one and all its coats, and by stripping off portions of the serous and muscular coats. With prompt repair of these injuries no harm has resulted; but in the following case a damage I thought of little consequence brought about the patient's death:

CASE IX.—*Ligature of Omentum Embracing Temporarily the Wall of the Intestine Causes Subsequent Perforation and Death.*—A woman, forty five years old, had a femoral entero-epiplocele, in part irreducible, for five years.

*Operation.*—August 30, 1890. The adherent omentum was ligated, excised, the stump returned, and sac removed after ligating

the neck. Before returning the omental stump it was found that the ligature embracing it had included a minute area of the wall of the small intestine which had formed part of the contents of the sac. It was replaced by another. The compression of the intestinal wall could not have lasted more than fifteen minutes, and the effect of the injury appeared to me trifling. Primary union resulted except at drain-sinus. But peritonitis developed on the eleventh day, from which death resulted on the seventeenth day. At autopsy there was found a perforative ulceration at the site of the ligature.

In considering this group of cases I hope it will be remembered that the proportion of operations requiring ligature of the omentum has been unusually large in my experience. The significance of this condition is apparent when one is aware of the number of cases met with. In a single year (1890-1891) 298 patients were seen at the Hospital for Ruptured and Crippled, in whose herniæ adherent omentum existed; 205 of these were adult males, 93 were women and children. These cases of irreducible hernia are most judiciously treated by operative measures. In dealing with the omentum, the following dangers are to be borne in mind:

1. Bleeding from inefficient ligature.
2. Damage to neighboring intestine from faulty application of the ligature.
3. Inflammation and abscess of the omental stump.

These dangers should make the management of the omentum the subject of special care. Any threatened inflammation should be met with prompt incision so soon as symptoms are urgent.

# HEALING UNDER A MOIST BLOOD-CLOT IN ACCIDENTAL WOUNDS.

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THE surgical care of accident cases presents many complications not met with in the practice of surgeons whose work lies in the direction of laparotomies for tumors, orthopaedics, or when points of election can be chosen. The points of election in traumatic surgery are the points that are left, and we must make the best of the circumstances as we find them. Not only is this so in regard to the location of operation, but the field presents a different picture.

The one, say, amputation of the thigh for sarcoma, is washed, shaved and cleansed with antiseptics hours before the knife is taken up; the other, a crushed knee for example, presents a dirty field around the wound, with grime and soot, grease and tar ground into the very wound itself, not to mention the local shock to tissues, out of which the surgeon may be called on to fashion his flaps.

Should these agents not be detrimental enough it may generally be counted on that the "first aid" rendered by the lay friend will have filled the cup of sepsis to the brim with his infected hands and his detrimental panaceas.

For these reasons aseptic results after traumatism rightly outshine like results after wounds of the surgeon's own making.

Indeed, one can agree with the author who says, "suppuration in a well-regulated operation should occur as seldom as an accident on a well-regulated railway."

As a matter of fact, I have ceased to have much anxiety on that score when I have the making of wounds myself; it is only

<sup>1</sup> Paper read at a Meeting of Clinical Society of Maryland, January 20, 1893.

when I have to deal with lacerations and punctures made by other than clean hands and a clean knife that I anticipate infection.

The ground for this confidence lies somewhat in the satisfaction I have had from the use of the blood-clot as described by Schede, and the increased discontinuance of the drainage tube, which so often is an avenue for infection even in wounds clean at the outset.

I will not stop to consider Schede's method in clean wounds, though from my reading and observation of other surgeons' methods I feel that its benefits have not begun to be appreciated. Some of the most modern text-books fail to mention it, or pass it over with a line. When distinguished surgeons still write about a new kind of antiseptic, or fancy they have done great work in the application of a novel style of drain, one cannot but feel that the value of the blood-clot method is not realized, or they would turn their attention to matters other than endeavoring to reach perfection in dressing when nature has provided on tap, as it were, a most beautiful example of conservation.

I am sure that this method offers much reliance to the country surgeon, who does not need to have a great armamentarium of dressings if he properly applies this. It is in the class of accident cases, when there are greatest adverse odds, that I ask attention, and while it is not universally successful, and these cases are not consecutive, for I have had pus cases sandwiched between them, sometimes through my own negligence or untoward curiosity infecting and breaking down a clot, still I think the following examples will show it may be often trusted, and when it fails it does not leave us in a much worse position than if it had not been used.

The first class of cases I shall mention are a series of three gunshot wounds, and are good examples of the advisability of shunning the *nimia diligentia chirurgiæ* or meddling interference. In two of these the ball passed directly into the tissues without taking any foreign matter with it; in the other it traversed only a cotton shirt, which showed no evidence of loss of substance. Except cleansing the neighborhood of the wound and putting on antiseptic gauze and iodoform and a splint if necessary, the

wounds received no further treatment than allowing them to fill up with blood. No effort was made to extract the ball, on the principle that the ball is the least noxious element in gunshot wounds, though its direction was indicated by introducing a sterile probe.

CASE I.—*Gunshot Wound of Skull*.—R. M. D., aged thirty-nine years, white, was admitted to St. Joseph's Hospital, Baltimore, with gunshot wound of skull. In a difficulty with a fellow-workman was shot by latter three feet away with an English bull-dog pistol, 38-calibre. Ball passed through two-inch pattern of wood and entered left ear at juncture of helix and anti-helix. Aseptic probe took downward and backward course (after removal of iodoform gauze with which wound had been stuffed), grated against eroded bone in mastoid process, but its locality was not made out. Wound and parts around cleansed, allowed to fill with blood. Ear packed with iodoform and gauze aseptic dressing applied. Dressing removed for first time in ten days. Wound healed. No rise of temperature or discomfort after recovery from shock. Discharged in ten days, well.

CASE II.—*Gunshot Wound of Face and Neck*.—A. S., colored, married, aged twenty-one years, was admitted to Maryland General Hospital June 29, 1892. Was shot twice by her husband with pistol, calibre about size of cat-rifle.

First ball entered right cheek, which was peppered with powder above the angle of the mouth; direction downward and forward. Second ball entered right side of neck; direction downward and backward. There was considerable effusion of blood along the course of the latter ball in the tissues of the neck, interfering with deglutition and pushing tongue forward to left side. The wounds were not probed, but surface cleaned. Iodoform and antiseptic dressing used. Temperature was  $100^{\circ}$  on third day. Dressing changed. No pus. Some bleeding. Redressed and discharged, well, in twelve days.

CASE III.—*Gunshot Wound of Elbow*.—D. B., colored, aged twelve years, admitted to Maryland General Hospital with gunshot wound of forearm, inflicted by a cat-rifle, two inches in front of the flexure of the elbow, anteriorly. Probe passed up in direction of joint, but ball not located. Vicinity of wound cleansed, but wound not irrigated. Iodoform, antiseptic dressing and splint applied. Temperature  $99^{\circ}$  on admission; normal afterward. Discharged in ten days, well.



The next two cases are compound fractures of the skull, differing, however, very much in extent.

CASE IV.—*Compound Fracture of Skull*.—J. R., aged twenty-two years, was admitted to St. Joseph's Hospital October 17, 1892, having been struck by the side of an iron bar in its fall from a roof. Had lacerated wound of occiput. Indentation on external table extending from over torcular herophili toward right ear. Stupid and hard to arouse. Pulse 60, going down in next two days to 40. No paralysis or eye symptoms. No signs of fracture beyond the depression, stupidity and slow pulse. Pared the lacerated edges of wound, let it fill with blood, closed without drain, removed dressing himself the second night, but wound did not become infected. Temperature became normal from 100° on second day. Discharged in two weeks well; states that he has normally a slow pulse.

CASE V.—*Compound Fracture of Skull*.—J. W., white, Pole, aged fifty years, entered St. Joseph's Hospital July 7, 1892, having been struck some hours before by an ore bucket, which lacerated scalp, and crushed in the back of his head like an egg shell. He was dressed with iodoform gauze at time of accident. His condition was one of profound shock, with more or less unconsciousness. Bone was driven into brain substance, about an ounce of which was extruded, longitudinal sinus torn, and when gauze removed bled copiously.

Six pieces of bone, in all a surface about three by three inches, were quickly removed, and to check the hæmorrhage the wound, large enough to hold a hen's egg, was tamponed with iodoform gauze. Lowest pulse 48°.

He was alternately delirious and conscious, singing, tossing and tearing at bandage until morphia gave him quiet. On July 9 the hospital report says, "is quiet this morning, conscious, but totally blind;" sight returning some toward night. Removed the gauze from brain without much bleeding, except enough to fill up the wound with clot. Put in gauze drain at lower angle (where, by the way, there was a little suppuration later), and sewed the wound up.

Continued to improve slowly, with highest temperature at noon of July 10, *i.e.*, 100.5°. Sight gradually returning. The brain pulsations were very evident at first under the scalp. Dressings kept on eight days, when they were removed, and the above-mentioned suppuration noticed, not extending to the deeper parts of the wound nor causing any marked inflammatory or meningeal complications. He

still suffers with dizziness and is unstable on his legs, but is out of the hospital and has otherwise good health. The wound site is now nearly as hard as skull, though there is marked depression.

My next series is three cases of knee injury as follows :

CASE VI.—*Compound Fracture of Patella*.—M. H., colored, aged thirty-three years, was thrown from carriage by runaway horse, and taken to Maryland General Hospital July 3, 1892. Beside contusion he had received a compound stellate fracture of patella of right knee. There was considerable laceration of superincumbent tissue, and easy access by probe and finger to seat of fracture. Three loose pieces of bone were removed after the parts had been washed. The wound was allowed to fill with blood without drainage, and closed by silk sutures. The limb was put in a splint, with ice applications, after dressing with rubber protective, iodoform and bichloride gauze, where it remained untouched for one week. His temperature on admission was  $101^{\circ}$ . In two days it fell to  $99^{\circ}$ , and then to normal, where it continued until discharged without further incident of interest on July 23 with a perfectly useful joint.

CASE VII.—*Compound Fracture of Patella*.—H. A., aged twenty-five years, Irish, was admitted to St. Joseph's Hospital September 9, 1892, having sustained a compound fracture of the patella by falling and striking against an iron plate. Iodoform gauze and bandage had been applied before he entered the hospital. There was ample access to fracture, and the lines ran rather in a stellate manner, though the ligamentum patellæ was separated from the bone above. I removed the comminuted fragments, and having pierced the bone with an awl, I united it to the severed ligament with one strong silk ligature, let the wound fill with blood and sewed up the incision without drainage; afterward the gauze bandages and splint were applied. Pain was controlled by morphia and iced cloths, and the dressing remained untouched until two weeks later, when it was removed and the line of incision was completely healed without suppuration. The patient was put on crutches and went about comfortably in his plastic splint. On October 20, six weeks after the accident, the stitches were removed, and in a few days there was quite an extensive stitch abscess, superficial, not involving the joint, which gradually yielded to treatment. He was discharged at the end of ten weeks with a joint capable of some flexion; the stiffness due to its prolonged extension on the splint was gradually yielding to

passive movement. I did not make forced flexion for fear of breaking up the union between the divided ligament and bone. His temperature reached  $102^{\circ}$  F. forty-eight hours after the accident; fell to  $100^{\circ}$  next morning, never going much above normal after that until the appearance of the stitch abscess which, being opened, it returned to normal again.

CASE VIII.—*Punctured Wound of Knee Joint.*—This case illustrates the blood-clot treatment of nature almost unassisted, as the injury was done three days before entrance to the hospital. Whether the result would have been as fortunate if the boy had received no further assistance I cannot say.

D. H., aged ten years, colored, fell off a fence on May 30, 1892. He was admitted to Maryland General Hospital June 2, with his knee considerably swollen. There was a punctured wound leading apparently into the joint, though it was not opened up, as it showed signs of closing. His limb was put in a splint with iced compresses, and his subsequent recovery was uneventful. His temperature was  $100^{\circ}$  on entrance, but normal the next day.

The next two cases are compound fractures of the tibia, complicated with extensive laceration, and in one case a simple fracture on the other side.

CASE IX.—*Compound Fracture of Left Tibia*; simple fracture of right.—W. L. S., aged forty-six years, fireman, white, was run over by hose carriage on May 7, 1892. When taken immediately to the Maryland General Hospital I found extensive laceration of left leg at seat of fracture (upper third), simple fracture of right tibia at lower third, and pronounced shock.

Under ether the compound fracture was dressed by removing the broken spicula of bone, washing the whole surface with bichloride, allowing wound to fill with blood, sewing up the laceration with silk without drainage, antiseptic dressing, with compression and long splint. The dressing having become bloody from the hemorrhage, a fresh dressing was applied on May 9—the wound, or rather line of incision, looking in thoroughly healthy condition. This was removed a week later, and a plaster splint with a fenestrum applied. At no time was the seat of fracture infected, though toward the end of treatment there was a little superficial suppuration due to the lowered resistance of the soft part from the injury, but the wound in the bone

pursued an aseptic course. His temperature reached  $101^{\circ}$  on one day, and the case made a good recovery. The simple fracture was put up in plaster.

CASE X.—*Strangulated Testicle*.—G. R., aged twenty years, white, single, upholsterer, had inguinal hernia on left side. While blowing cornet, October 9, felt it descend. Had some symptoms of strangulated hernia, vomiting, pain over tumor. Seen in consultation with Dr. Clewell, October 11. Condition fair; no marked symptoms of strangulated hernia except irreducible, slightly painful tumor in scrotum. The next day a suspicious crackling on pressure in the vicinity of the tumor induced me to cut down over it after reducing a part under anæsthesia. Found sac thickened, but containing no gut or omentum, but below it lay the testicle, gangrenous and emphysematous from a series of twists of the cord, which had cut off the circulation. Removed testicle and sac after tying them near external ring. Closed wound as usual, allowing capillary oozing to form clot, and inserted a sliver of gauze in the lower extremity of the wound in case drainage was needed. It was removed in forty-eight hours, and the incision healed without further trouble.<sup>1</sup>

CASE XI.—*Compound Dislocation at Elbow*; fracture of radius at wrist.—B. K., aged nine years, white, fell from a ladder on June 8, 1892, and was admitted to Maryland General Hospital on same day with above-mentioned injuries. The dislocation was of the radius and ulna backward, with about one inch of the humerus and its condyles forced through a lacerated wound on the anterior aspect of the joint. There was also a simple fracture of the radius near the wrist on the same arm. After washing the neighborhood of the dislocation with bichloride, but not introducing it into the wound, under an anæsthetic the dislocation was reduced and the lacerated wound brought together with silk, after allowing it to fill with blood. Antiseptic dressing of iodoform protective gauze, etc., was applied.

<sup>1</sup> I am indebted to Dr. W. W. Keen, of Philadelphia, for his kindness in furnishing me with references bearing on this rare lesion. I append them as follows:

Bryant and Keen, *Lancet*, 1892, Vol. I, p. 472.

N. Y. Med. Record, March 19, 1892, p. 339.

Davies Colley, *Brit. Med. Jour.*, 1892, I, p. 811.

Cervais, *Centrallbl. für Chirurgie*, 1892, No. 10, p. 213.

Whipple, *Brit. Med. Jour.*, 1891, I, p. 1226.

Bevan (Bacteriology of Keen's case), *Phila. Med. News*, April 30, 1892, p. 490.

Page, *Lancet*, 1892, II, p. 257.

the fracture at the wrist set, and the whole put in a pistol-shaped splint, where it remained under inspection until June 21, when the wound was found satisfactorily healed. Passive motion was begun later, and the arm is now a useful and flexible member, though there is a slight deformity at the wrist, due to impaction of the fragments, which does not interfere with motion at that joint. His elbow is not even stiff. His temperature was normal after the first day until he had a malarial chill on the thirteenth day, which quickly yielded to quinine.

The last case to which I ask attention, while not a traumatic case, presents so markedly the conditions that I have endeavored to emphasize in the above accidents, namely, infection and lowered resistance of surrounding tissue, that I do not feel it mal-apropos in this series.

CASE XII.—K. C., colored, female, aged forty years, was admitted to the Maryland General Hospital June 1, 1892, with the following history: One year previously her right breast had been removed for carcinoma. In the anterior part of the scar, over the sternum, there was now a recurrence about the size of a tomato or small apple, three inches in diameter, a suppurating growth, ulcerated on top, and extending several inches along the old scar toward the right axilla. The right arm was cedematous, both axillæ presented enlarged glands, and the left breast was a carcinomatous mass, not yet adherent to the skin except in the lower hemisphere. After disinfecting the part as far as possible, the right axilla was first cleared out, then the left, the axillary artery appearing under the knife in both. The whole old scar was excised, including the suppurating growth, and a flap, taken from the upper non-infiltrated surface of the left breast, with its pedicle pointing toward the left shoulder, was transferred to cover the excised tumor and scar. The left breast was then amputated, bleeding checked by torsion, and the sides of the irregular wound brought together by a continuous suture with a small pledget of iodoform gauze in each axilla.

There was no attempt to dry the surface of the wound or to check the oozing, as I wished to avail myself of the blood-clot feature, and trusted to pressure to prevent serious hemorrhages. The line of incision was then covered with iodoform, protective gauze, and snugly bandaged. When the first dressing was removed (nine days later, I think), union had taken place everywhere, except at the

extreme end of the transferred flap, where tension had caused a small slough, and in each axilla the point of exit for the gauze was, of course, open. I suppose the lines of the irregular incisions must have measured nearly a yard in extent, and were healed throughout, except about two inches in the middle and a quarter inch in each arm pit. These latter closed on removal of the drain; the former granulated. She left hospital much more comfortable, but, realizing the probability of a return, as she had not been deceived about its likelihood.

In these twelve cases I consider that I have had most material assistance in the retained clot. In some there has been a little late superficial suppuration as stitch abscess, but at no time have the deeper parts of the wound been infected, and I am convinced that life has been saved, and joints have been kept useful, from using the natural antiseptics of the blood clot rather than deluging them with necrosis-producing artificial remedies; and right here I would not confine the word antiseptics to the germicide quality of blood clot, for that seems not to be proven satisfactorily, but in its wide sense for the prevention of suppuration, however it acts, for, as Cheyne says: "Aseptic surgery is not treatment by spray, nor by gauze, nor by spray and gauze, nor by carbolic acid, but any method which aims at, and succeeds in, excluding causes of fermentations from wounds."

# DISEASE IN THE SACRO-ILIAC ARTICULATION.

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AND

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**D**ISEASE in the sacro-iliac articulation is of rare occurrence, occurring generally between the ages of seventeen and thirty. Existing apart from spondylitis in the lower lumbar spine it is of still rarer occurrence, and the diagnosis is so obscure that surgeons, careful observers, and of extended experience in joint diseases, affirm that they have never met with it.

For the most part, and perhaps always, the disease is tubercular, and is governed by the same laws of pathology, symptomatology, prognosis, and treatment that govern articular tuberculosis elsewhere. To spondylitis, however, the relation is especially close, and, as has already been stated, it occurs much more frequently associated with lumbar spondylitis than as a separate and distinct articular affection.

Traumatism appears to be frequently the exciting cause, but there can be no question, that the disease occurs without any remembered injury, especially in those predisposed by heredity to tubercular infection. It may commence in either of the bones which go to form the joint, or in their neighborhood. Disease of the bones is far more frequently met with than that of other structures, and, on account of the strength and thickness of the posterior ligaments and the absence of definite subjective symptoms in an early case, it is rarely recognized before suppuration

has occurred, or the bone considerably invaded. The disease may be of the so-called moist form, and show early suppuration; or of the dry form, and run its course without suppuration; or the dry form under certain circumstances may at any time become suppurative.

Van Hook, who has made the most careful study of the literature of the subject, believes that the dry, non-suppurating form rarely imperils life, and that the prognosis is in every way good, but that in the suppurating form the prognosis is exceptionally bad. It appears to us, however, that the symptoms detailed of many of the non-suppurative cases hardly warrant the diagnosis of sacro-iliac tuberculosis, and by that much detract from the weight which they would otherwise give to a favorable prognosis; and that the fatal termination and consequent unfavorable prognosis of the suppurative cases have more frequently been due to the character of the operative interference than to the nature of the affection. There seems to us to be no good reason for believing that tuberculosis of the sacro-iliac articulation is governed in its fatalities by other laws than those governing the fatalities in tuberculosis of other joints, while our limited clinical experience with the disease goes to confirm this view. As in spondylitis, death occurs from tubercular infection of other organs quite as frequently in the dry as in the moist form of the disease, provided there be no operative interference. Death from prolonged suppuration is exceedingly rare when tubercular abscesses are subjected to the let-alone treatment, and rarer still is death from septic infection. On the other hand there can be no reasonable doubt that any operative interference increases the risks of general tubercular infection; and, unless the operation be strictly aseptic, and the prolonged subsequent dressings be kept so, the risk from septic infection of a large cavity connected with carious bone is considerable. In a word, any operation which fails to remove all tuberculous material and to close the cavity by primary union without drainage, though demanded as a last resort, should be recognized as distinctly adding to the risks to the patient's life. The records of the cases observed show that fatal termination is usually due to septicæmia, simul-



taneous or intercurrent tuberculosis elsewhere, or general miliary tuberculosis.

*Symptoms.*—The first symptom to appear is usually a peculiar attitude, a "listing" of the trunk toward the unaffected side, or, more properly speaking, a shifting of the pelvis toward

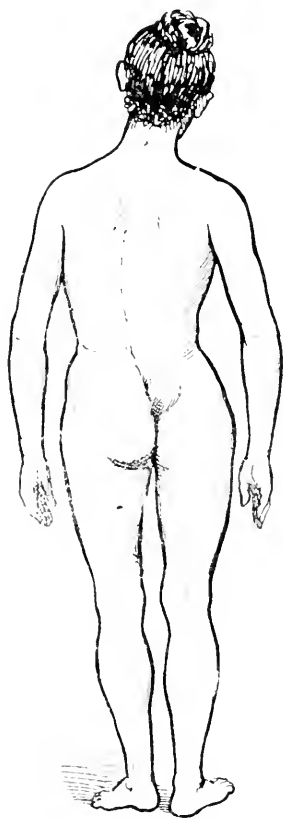


FIG. 1.—Sacro-iliac Disease  
(abduction).

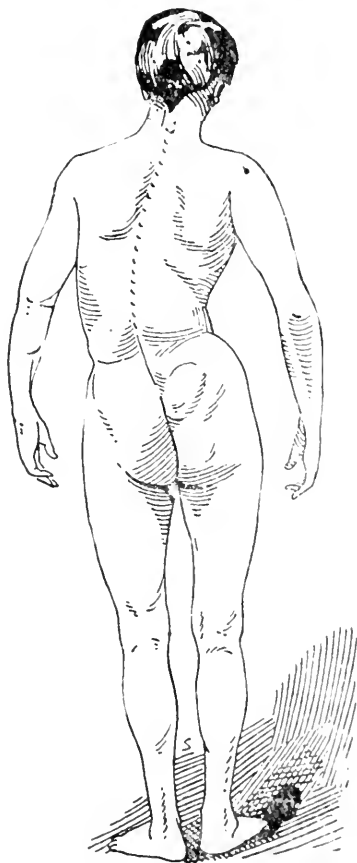


FIG. 2.—Sacro-iliac Disease  
(adduction).

the affected side, and as this progresses the spine assumes a long sweeping curve with its convexity toward the sound side. Before the peculiar attitude has become sufficiently marked to cause comment the patient has usually found himself fatigued from

comparatively slight exertion, and has experienced difficulty in bending forward and rising up again. Ultimately stooping becomes quite impossible. The gait becomes of a waddling character, and as the disease advances the patient usually becomes unable to walk at all. In the early stage there is generally no flexion of the thigh, and apparent lengthening may or may not be present, while apparent shortening is sometimes observed.

The patient on standing, rests well upon the heel of the affected side, but places nearly all his weight upon the sound leg. The distant or referred pain, characteristic of tubercular arthritis elsewhere, is usually present here, but may be absent, and is more frequently characteristic of this affection than of disease in the hip or spine. If present it is usually felt in the lower abdomen, but may be complained of anywhere along the front of the thigh, and also along the area of distribution of the sciatic nerves. At first the swelling of the joint structures is often more easily made out by palpation per rectum, probably owing to the anterior sacro-iliac ligament offering much less resistance than the powerful thick posterior ligament; and early swelling, therefore, is directed toward the interior of the pelvis. Sooner or later, however, the external swelling appears and, in most cases, advances to true fluctuation, and the tubercular abscess is present as a complication. These abscesses may, and generally do, extend in every possible direction; upward in the multifidus spinæ into the lumbar region, downward along the psoas muscle or into the buttock, to the right or to the left, or directly inward to open into the bowel.

The direction in which the pus travels may be:

(1) Through the anterior ligament, keeping outside the pelvic fascia, (*a*) following the course of the sacral nerves and pyramiformis out through the great sacro-sciatic foramen, and forming an abscess under the gluteus maximus; (*b*) following the curve of the sacrum behind the rectum to point in the ischio-rectal fossa, causing inflammation and adhesion of the rectum and ultimately bursting into it; (*c*) coursing under the lumbo-sacral ligament into the psoas muscle and thence into the thigh; (*d*) or into the iliacus muscle and thence into the groin.

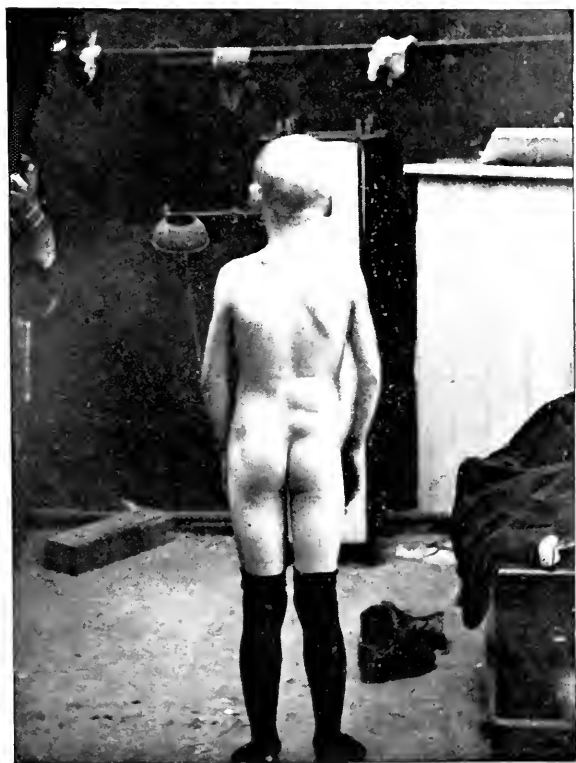


FIG. 3.—Abscess in Sacro-iliac Disease.



(2) Through the back part of the joint into the multifidus spinæ, creeping along it and pointing in the lumbar region, or directly over the joint itself.

Muscular atrophy of the buttock and thigh muscles is uniformly present. Deep pressure over the articulation often causes pain before much, if any, swelling is noticeable, and pressing together or pulling apart of the pelvic bones also usually produces pain. This pain appears to be due more to the motion imparted than to the direct pressure exerted. At times there is a tilting of the bones one upon the other, and the joint forms a horizontal kyphosis or a deep depression. Spasmodic contraction of the psoas muscle is a pretty constant and early symptom; resulting from this the thigh becomes somewhat flexed on the pelvis and rotated outward; hence, frequent confusion with hip disease. All of the motions at the hip may appear to be restricted, but if the pelvis be steadied and the manipulations conducted with such gentleness as to not disturb the sacro-iliac joint, it will be found that, when the thigh is slightly flexed to relax the tension upon the psoas, all the hip-joint motions are normal except those which put the psoas on the stretch, namely, extension and inward rotation. In the same way the contracted psoas muscle limits the motions of the lumbar spine, and the resulting condition simulates lumbar spondylitis. Passive bending of the spine toward the affected articulation or forward when the patient is recumbent in a forward direction, if done with great gentleness and with the pelvis steadied, will by the freedom of movement exclude spondylitis from the diagnosis. The differential diagnosis is chiefly to be made from hip disease and spondylitis, and it can only be made by remembering that disease in any joint restricts, not some, but *all* its normal movements to some extent. In cases of sacro-iliac disease where the muscular spasm and pain are intense, it may not be possible at once to differentiate, especially since the disease has been seen to be coincident with hip disease, and since it is more frequently found in connection with spondylitis than existing alone. The condition may be mistaken for sciatica, or for intra-pelvic inflammation, or abscess in connection with old and recent peri-typhlitis, but a careful examination and a consideration of the history of the case should clear up these points.

*Mechanical Treatment.*—The mechanical treatment of sacro-iliac disease is not one of the most encouraging of orthopaedic problems. It consists in a more or less successful attempt at immobilization, but it is found far less easy to immobilize this joint than the hip or spine, and satisfactory immobilization by an ambulatory apparatus is practically out of the question. The ambulatory apparatuses which have seemed the most successful have aimed at the accomplishment of two things—immobilization by circumferential compression by a broad girdle, and limitation to voluntary motion by a spinal apparatus which restricts forward bending. There is no question that motion in the lumbar spine is contra-indicated, and there should also be no question that motion at the hip joint is contra-indicated, but restriction of the latter has not been attempted by ambulatory apparatus, since it would prevent the patient sitting. The fact that the girdle in a certain number of cases relieves pain, which is not relieved but too often aggravated by traction, points very suggestively to the direction of the true and false principles of the treatment of joint disease, namely, that a force which tends to immobilize, even when associated with a force which crowds together the articular surfaces, relieves pain where a force which tends to separate the joint surfaces without immobilization fails to relieve, and often increases the suffering. The mechanical treatment, then, which should be employed, is the Thomas double hip splint, with the main stems separate at such a distance that they will pass to the outer side of the posterior superior spines of the ilia, with a broad leather sling passing from one stem to the other, and reaching from the coccyx to the mid-lumbar region. Lateral wings should be attached to the stems to pass around the flank on either side, and the pelvis is to be encircled by a broad girdle of leather or webbing.

The patient is to be kept continuously recumbent until the active stage of the disease has subsided for some time. Inasmuch as this disease appears usually in adult life and but rarely in children, and inasmuch as the joint is readily accessible, we are of the opinion that as soon as suppuration occurs operative measures looking to the removal of all tubercular material are to be

considered, and that such measures are justifiable in a very much larger percentage of cases than when the disease is located at any of the other joints. It is of advantage to prevent, when possible, intra-pelvic burrowing, and this can be done without our having to reflect (as we are forced to in the case of hip or knee) upon

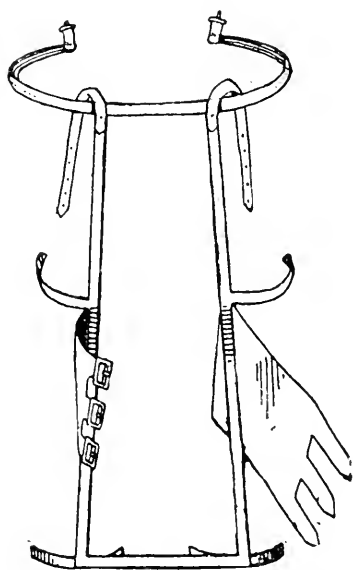


FIG. 4.—Apparatus for treatment of Sacro-iliac Disease.

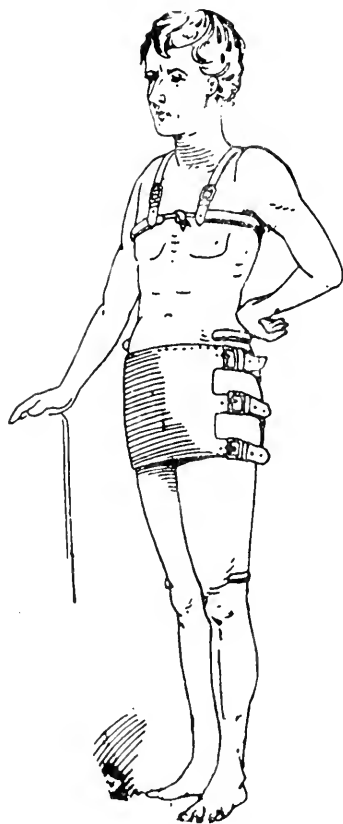


FIG. 5.—Patient in apparatus.

an ankylosis which is harmless, or a shortening of limb which, of course, cannot occur.

The *Operative Procedures* are determined by the facts learned from palpation externally and by the rectum. If an abscess can be detected within the pelvis the incision is made directly down upon the ilium external to this point, the bone trephined, the

abscess cavity gently and thoroughly cleansed, more bone removed, if necessary, with cutting forceps or chisel, all cut bone surface thoroughly seared with the actual cautery and the wound closed. If no point of fluctuation can be made out, the incision is determined by the œdema, or in the absence of œdema by the tender point. The bone is trephined for a cascating centre, and the subsequent steps of the operation are as above indicated. After any operative procedure the joint should be immobilized in the Thomas double hip splint, and the patient confined to bed until all local tenderness has passed away.

It is possible that there are more reasons to justify the use of the drainage tube after operations upon this joint than upon others, but we believe that a second or several repetitions of the operation entail less risk than its insertion.







FIG. 1 — Normal foot (right)



FIG. 2 — *Equino varus* (left)

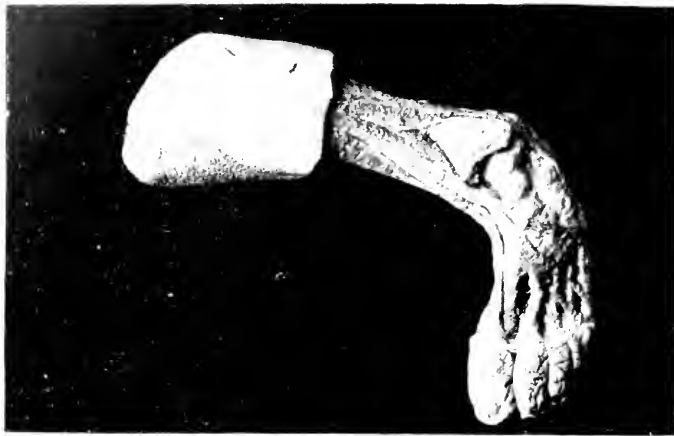


FIG. 3 — *Equino varus* (left)

# A CONTRIBUTION TO THE ANATOMY OF CONGENITAL EQUINO-VARUS.

By HERBERT L. BURRELL, M.D.,

OF BOSTON.

THE specimens which are illustrated in this article were obtained from a child born at seven months, and which lived for three or four hours. They were given me by Dr. W. N. Bullard. The right foot was normal. The left foot was in a position of moderate talipes equino-varus. The anterior part of the left foot could be corrected manually; but the sole of the heel tended always to face inward. The axis of the foot was curved, with the concavity inward. The plantar fascia was but slightly contracted.

Any attempt at correction of the deformity put the tendo Achillis, and the group of tendons lying behind the internal malleolus, viz., the flexor longus digitorum, flexor longus hallucis, and tibialis posticus, on the stretch. The skin over the tendons, as they crossed the inner border of the foot, was tense when the foot was in a corrected position.

*Dissection.*—The skin over the inner border of the foot, where the internal group of muscles turn to reach the sole of the foot, was more adherent to the underlying tissues than in the normal foot. There was no difference in the size of the bellies of the muscles; the sheaths of the tendons were apparently normal; the plantar fascia was not markedly contracted, but became tense when the foot was brought into a corrected position.

*Astragalus.*—The astragalus of the deformed foot was small; its neck was short; the axis curved with the concavity inward; the articulation surface was anteriorly smaller than that of the normal astragalus. In the normal foot the articulating surface of the astragalus with the tibia was divided into three facets by two ridges; in the deformed foot, where the astragalus articulated

with the tibia, there were but two facets, with a single ridge separating, one for the lower end of the tibia, and one for the external malleolus; instead of the facet for articulation with the fibula being covered with glistening cartilage it was covered by connective tissue. The outer part of the articulation surface of the deformed astragalus, as it articulated with the scaphoid, was distinctly diminished in size. The inter-articular ligament between the astragalus and os calcis was rudimentary.

It is interesting to note that the plane of the superior articulating surface of the os calcis was oblique, and faced inward and upward in the deformed foot, and that the depth of the os calcis was considerably greater on the outer than on the inner side. The os calcis of the deformed foot was small.

The dissection of these feet has been a matter of great painstaking by Mr. H. G. Gross, formerly house surgeon at the Children's Hospital. So far as I know, these specimens are unique, and very great care has been taken to describe them accurately, as it must be self-evident that their careful observation may be a contribution to the knowledge of clubfoot.





FIG. 1—Appearance presented after total excision of jaw and removal of secondary growth.



FIG. 2.—Secondary tumor removed, as shown in Fig. 1

# TOTAL EXCISION OF THE LOWER JAW FOR MALIGNANT DISEASE.<sup>1</sup>

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WHEN considering the advisability of a given operation, the first question demanding an answer is, does the operation contemplate the cure or only the palliation of the disease; and secondly, in the latter event, is the knife especially dangerous to life?

If the primary disease for which we are usually called upon to remove the lower jaw were of an epitheliomatous nature, viz., truly carcinomatous, I might feel it incumbent upon me to elaborately demonstrate the local origin of carcinoma, for there are a very few who still believe this disease to be of constitutional origin, utterly ignoring all experience, pathology and analogy, when properly interpreted. Here and there a young man, desiring to attract attention, hopes to become notorious by taking the opposition side at the cost of retrograding in science, or, at best, remaining stationary in knowledge. The day has gone by when the *ipse dixit* of any man, however eminent, will of itself carry conviction, but every statement is placed in the crucible of experiment—pathological or clinical—and is compelled by the fierce heat of the experience of the majority to reveal whether dross or pure gold preponderates in its composition.

Fortunately, however, no such formidable task is demanded of me, because no epithelial elements being found in bone its only primary malignant growths must be of the connective-tissue type—in other words, sarcomata, which most assuredly are not maintained now-a-days to be of constitutional origin, yet which

<sup>1</sup> Read before the Northern Tri-State Medical Association, at Hudson, Mich., December 6, 1892.

are often more rapidly fatal to life than any carcinoma can be. The questions propounded can best be answered by a modification of Heyfelder's statistics for excision of the lower jaw. I am perfectly aware how fallacious statistics may prove, but so far as the death rate is concerned, and the frequency with which recurrence takes place, figures on a sufficiently large scale are thoroughly reliable.

Thus, of forty-four operations for malignant disease, twenty-three were failures so far as recurrence is concerned. Nevertheless, these patients' lives were prolonged, and a painful, disgusting condition was at least for months removed and health temporarily restored, because ulceration in the mouth entails the constant swallowing of fetid pus, which rapidly undermines health, at the same time rendering life miserable indeed.

I am also inclined to believe that in the future the number of recoveries without recidives will be greater because of the adoption of more radical methods of treatment.

If such a percentage of recoveries without recurrence were obtainable at a great risk to life more hesitation might be felt in urging operation, but the following figures, modified from Weber, give the results obtained in operations upon the lower jaw for all causes, and probably correctly represent the mortality *per se*: moreover, many of the cases were treated during the pre-antiseptic era:

	Whole Number.	Cured.	Relapsed or Died.
Complete extirpation . . . . .	22	20	2
Disarticulation, half . . . . .	155	118	37
Partial excision . . . . .	251	205	46

Of those classed under the heading "relapsed or died" a large proportion must have belonged to the former division, having recovered from the operation, but eventually died from the disease. This statement is certainly warranted by the results in the cases which I have added to the list, none of these having died from the operation itself.

I think that a brief history of my case, viewed in the light of the foregoing facts, will warrant certain conclusions which I shall append.



Charles L., white, married, aged thirty-three, entered the University Hospital March 24, 1891, stating that some time during the previous July he had noticed a small bony growth of the size of a small pea on that portion of the inferior border of the lower jaw corresponding to the first true molar tooth. The extraction of two teeth early in October was followed by the formation of a fungating mass springing from the alveoli of these teeth, with rapid increase in size of the jaw from the angle nearly to the symphysis. The free, offensive discharge, continually swallowed with the sloughing of portions of the growth, rapidly reduced his strength. On March 30, 1891, the right ramus, with the corresponding portion of the body of the jaw extending somewhat to the left of the symphysis, was removed. Prompt recovery occurred, the patient being discharged April 25, 1891; but shortly after his return home he noticed local recurrence, re-entering the hospital May 12. May 14, 1891, the remaining portion of the jaw was exarticulated and the floor of the mouth freely dissected away. On June 10, 1891, he again returned home, apparently free from disease, one or two silk ligatures being still attached, but the sinuses left along their tracks soon healed after their separation. No recurrence was noticed after the second operation for over two months, when a small, slowly-growing mass appeared in the right side of the scar. Some time during last February the tumor began rapidly to increase in size and upon his third admission to the hospital, April 16, 1892, Plate I well represents the size attained.

After repeated examinations it was feared that both the deep and superficial carotid arteries were involved in the growth, so that on April 22, 1892, the common carotid was exposed just above the omohyoid muscle, and a ligature was passed around that vessel, but it was not tightened. A most tedious dissection of over two hours finally enabled me to safely remove the growth, which was attached for fully two inches to the sheath of the deep vessels.

Whether or no the external carotid was divided could not be positively ascertained owing to the peculiar condition of the parts after the repeated operations, but it was believed to have been tied in the wound. No necessity arising for tightening the ligature upon the common carotid, it was withdrawn.

All the branches of the facial nerve were divided except those supplying the orbicularis palpebrarum muscle, the trunk lying bare at the bottom of the wound, with its terminal filaments hanging loose.

Prompt recovery, without a bad symptom, again took place, the

patient returning home with only a couple of minute granulating points unhealed in the whole line of the enormous incision, which reached from the zygoma above, along the border of the sterno-mastoid muscle nearly to the sternum; from the middle of this a second was carried, extending forward to the angle of the mouth.

The conclusions which I would submit for your consideration are as follows:

1. That in all primary malignant tumors of the lower jaw at least one-half of this bone, including the ramus, should be removed, with every vestige of periosteum, when possible.

2. That as experience has proved that in sarcomata of the long bones amputation in continuity rarely succeeds, the operation analogous to amputation in contiguity be adopted, viz., total excision of the lower jaw whenever the disease extends along the body much anterior to the angle.

3. That the superior ease and safety with which the operation can be completed renders it advisable always to divide the lower lip in the median line, the resulting cicatrix adding little if anything to the resultant deformity.

4. That no hesitation need be felt and no delay indulged in in removing recurring growths, because they nearly always originate from fragments of periosteum left behind, or in the attachments of the maxillary muscles, *i. e.*, in parts capable of thorough removal: the origin of these secondary growths from the parts mentioned is proved by the fact that they usually consist partly of bone.

# GRADUAL AUTO-INOCULATION AS A FACTOR IN THE PRODUCTION OF IMMUNITY FROM THE EFFECTS OF SEPTIC INFECTION.

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CASES of appendicitis frequently occur which run a peculiarly malignant course. Their history is generally somewhat as follows: A foreign body or concretion gains access to the vermiform appendix and acts as the exciting cause of a peculiarly acute inflammation which causes gangrene or perforation of that organ. This inflammation is so rapid in its development that there is no time for adhesions to form around the focus of disease, or, if such do form, they are immature, weak and imperfect.

The discharges from the appendix gain access to the general peritoneal cavity, causing death from acute septic intoxication or from peritonitis of the acute hemorrhagic type. Here, operation, after perforation has occurred, is practically useless. The dose of poison administered has been too large and too virulent for any surgical efforts to be of much avail against it.

The same character of peritonitis and acute septic intoxication is sometimes observed after operations for ovarian papillomata, after operations and injuries to the intestines, and so forth.

These cases, as a rule, resist all measures for their arrest, such as irrigation and drainage. The patients die, almost as surely as do men unaccustomed to the use of morphine or arsenic when large doses of these drugs have been administered to them.

It is by no means uncommon to find cases of extensive pyosalpinx, which have run a long course of chronic invalidism, present the following history: The suppurative lesion has been present for many months; suddenly, after some slight exertion,

there is great pain in the lower part of the abdomen; the distended tube has burst; fever now is generally a marked symptom, though it may be entirely absent; the pulse is poor and rapid; the belly becomes distended and painful; the face becomes pinched, etc., etc.

A case of this nature came under my observation recently, in consultation with Dr. Lilly. The pus tube ruptured about 4 A.M. The abdomen was opened between 7 and 8 A.M. The belly cavity contained much foul pus. Owing to the general condition of the patient no sponging or flushing of the cavity was attempted. A glass drain was introduced and the patient made an uninterrupted recovery.

In these cases a very large dose of a very powerful poison is suddenly thrown into the peritoneal cavity, and only after the lapse of a greater or less length of time is any means provided for it to drain off, and yet in spite of this many patients recover.

In another class of pyosalpingitic cases we find, from extension of septic infection, that a suppurative inflammation is present around the pus tubes. We have, in fact, a suppurative perisalpingitis as well as pyosalpinx. There are, in the neighborhood of the pus tube, encysted collections of pus, often extremely foul.

Such cases I have seen frequently in my own practice and in that of others.

Here it is practically impossible to remove the pus tube without rupturing the surrounding collections of pus, some of which have extremely thin walls. Often in such operations very much pus, frequently stinking, escapes into the upper regions of the belly, where the peritonæum is apparently healthy. This pus may be partially removed by irrigation or sponging, with subsequent drainage; sometimes, as in a case I saw a few days ago, the condition of the patient will not permit of flushing to be thought of, and drainage alone has to be relied on.

Yet such patients, in spite of the serious operative interference, in spite of the enormous dose of poison administered through the peritonæum, in spite of their apparently poor condition prior to operation—in spite of all these disadvantages, such

patients generally make a good recovery. In the class of cases last mentioned the dose of virulent poison is out of all proportion, in size, to that administered by the perforation of a very acutely inflamed gangrenous vermiform appendix.

In many cases in which Fallopian tubes distended with pus and firmly adherent to their surroundings are removed by operation, no perisalpingitic collections of pus are present, and yet, owing to inexperience on the part of the surgeon or to specially thin and friable walls on the part of the pyosalpinx, the tube is accidentally burst and healthy peritonæum is bathed in pus. Yet commonly no evil results, although the pus may be very imperfectly removed.

Why is it that there should be such a difference between the results in different cases? Why, in one great class of cases, of which I have taken appendicitis as a type, should a *comparatively* small dose of virulent poison, administered through the peritonæum, cause acute hæmorrhagic peritonitis and death, while in another class of cases, of which pyosalpinx is a type, even enormous doses of a virulent poison may be recovered from under appropriate treatment? Why is this? I think that in the doctrine of acquired immunity we may find something to aid us in solving this very important question.

Every one knows of the researches of Behrens and Kitasato. How these distinguished investigators have separated a substance from the metabolic product of the tetanus bacillus, animals inoculated with which are immune against subsequent inoculations of the tetanic germs while unvaccinated control animals die.

Every one knows that many other diseases can be prevented by various forms of vaccination. Is there any means by which immunity to the poisons of pyogenic organisms may be attained? Reichel has, I think, proven that the production of such an immunity is possible. The results of his researches are published *in extenso* in *Langenbeck's Archives* (Bd. XLII, 3, p. 237 *et seq.*), in an article of which but little notice has been taken by any of our journals, and from which I propose to quote or abstract freely in the succeeding paragraphs.

(1) The first question which Reichel set himself to investi-

gate experimentally was, whether by administering gradually-increasing doses of pure cultures of pyogenic micrococci to the peritonæum of an animal an immunity against an extremely large dose of this poison could be produced? The results of his experiments (dogs being the animals used) were the following: "In each of these six cases the control animal died suffering from the most *severe hæmorrhagic peritonitis* and *sepsis foudroyant*, while the animals which had undergone previous inoculations not only remained alive, but generally showed scarcely a trace of illness the day after the injection was made."

(2) The second question Reichel investigated was, whether by the administration to the peritonæum of gradually increasing doses of a sterile filtrate of pure cultures of pyogenic cocci, immunity could be produced against a large dose of the same filtrate injected into the peritonæum? Many experiments to settle this matter were made most carefully, and gave the following results: "Animals previously vaccinated with small, gradually-increasing doses of the metabolic products of staphylococci, when at length inoculated with very considerable quantities of sterile filtrate only showed a slight reaction to the poison, as manifested by a transitory sickness from which they had entirely recovered by the following day. The control animals, into which were injected equal quantities of the poison, without exception became very ill, and only recovered slowly after an illness lasting several days, while some died.

(3) Another series of experiments made show that immunity against the action of staphylococci themselves can be produced by vaccination with their metabolic products. These experiments it is needless to describe; they may be found in the article already referred to.

(4) From a careful review of his previous experiments, and from the results of some others specially made, Reichel comes to the following conclusions: "These experiments, in my opinion, undoubtedly prove that the immunity against the virus of pyogenic micrococci attained by the methods described is an immunity of the whole organism. In other words, that this immunity not only enables the nerve centres and the heart to withstand the

noxious poison of the infection, not only diminishes or destroys the susceptibility of the peritonæum to its irritation, but that it increases the power of every tissue, even of the subcutaneous fatty tissues, to resist the phlogogenic properties of the cocci."

As to the length of time tissues remain more or less immune against pyogenic organisms Reichel cannot state positively, but probably not longer than six weeks.

The class of suppurative cases of which pyosalpinx has been taken as typical, in which the peritonæum may have been bathed in virulent pus and yet mere drainage often effects a cure, seems to me to have undergone a sort of *preventive auto-inoculation*. These lesions have usually been present for a considerable period of time, and absorption of bacterial metabolic products has taken place from them. If Reichel's experiments can be accepted as conclusive, then such a continuous absorption of such a material *must* prepare the patient so that a vigorous resistance can be made to the noxious materials thrown into the peritoneal cavity by the bursting of pus tubes. On the other hand, in cases of which a *very acute* appendicitis is typical, the lesions are recent, generally very recent, and no protective auto-inoculation can, by any possibility, have occurred.

In opposition to this explanation of the question under consideration it may be urged that, in the case of acute perforative appendicitis, the poison is different in character from that present in pyosalpinx. This is no doubt true. The researches of Fraenkel (*Wiener klin. Woch.*, 1891, Nos. 13, 14, 15) and of others show that the organism most to blame for the troubles following appendicitis is the *bacillus communis coli*. In the same paper we find that this bacillus can also, under different circumstances, produce a suppurative peritonitis of which encapsulated foci of pus are a feature. This fact clinical observation supports, because in cases of subacute appendicular peritonitis we frequently have a collection, or collections, of pus localized by adhesions, relief from which may be promptly obtained by operation.

On the other hand, the experiments of Reichel, already referred to, prove most conclusively that in animals unprepared by previous inoculations, large doses of pure cultures of pyogenic

cocci similar to those found in cases of pyosalpinx, when injected into the belly, cause acute hæmorrhagic peritonitis of the most severe type ; in other words, that these animals die in the same manner as do patients suffering from the most acute form of perforative peritonitis.

For these reasons I think we may give little weight to the fact that, in the two classes of cases under consideration, the poison is of a different origin, seeing that, under like circumstances, they are capable of producing the same results.



# A NEW AND RAPID METHOD FOR HYSTERECTOMY.

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I WISH to describe a method of performing complete removal of the uterus which I have recently practiced in a number of cases, it having proven exceedingly satisfactory and unusually speedy, one operation having been completed within twenty-five minutes. Two nights before the operation the bowels are opened, compound licorice powder being commonly used; this dose is repeated the evening prior to operation; with a vaginal douche of hot boric-acid solution. One hour before operation the bowels are washed out with a copious enema, and the douche repeated.

When completely under the anæsthetic the abdomen and vulva are shaved and thoroughly scrubbed with soap and water; then dried and washed with sulphuric ether; then rubbed with a saturated solution of permanganate of potassium until of a deep mahogany color; decolorized by a strong solution of oxalic acid, and finally douched with a solution of bichloride of mercury, 1 to 1000. The patient's legs are wrapped in blankets, covered with bichloride towels, and held widely apart by a nurse; the vagina carefully washed out with the bichloride solution, followed by hot water. Hands of operator and assistant having been cleaned, and the abdomen protected by hot bichloride towels, as in any other laparotomy, an incision is made through the abdominal wall close to the middle line, four inches in length. The ovary and tube of one side are caught and pulled into the opening, and a clamp applied to their outer side, but as close to the uterine body as possible; a heavy catgut ligature is passed

through the broad ligaments, tied, and a cut made between the ligature and the clamp. The other side is then treated in the same manner, when the uterus, with its attached tubes and ovaries, may readily be brought up into the opening.

Unless this preliminary step is made, much valuable time will be lost in attempting to urge the fundus into view, the extreme tension of the broad ligaments absolutely prohibiting; because of this, only one side of the uterus can be seen at once, and no amount of force can lift it up until the broad ligaments are divided. As soon as this is done the circular shape of the bladder disappears, the organ extending itself outward and backward, the corrugations of peritonæum upon its border ceasing to be prominent. The fundus is now tilted backward, a cut made transversely across the uterus, through the peritonæum, and separation of bladder from womb accomplished methodically and completely. This line of incision should be made just behind the vesico-uterine fold, which is easily recognized by touch; the dissection is done partly by fingers and partly with some blunt instrument (I prefer the ends of my blunt-pointed, curved scissors, used closed), the bladder being pressed away little by little, below and in front. When the region of the os tincae is reached, one finger is slipped into the vagina, the exact location determined, and the scissors pushed through the mucous membrane; this opening is extended across the anterior surface of the cervix, as in the initial step of vaginal hysterectomy, save that the cut is made from above instead of below. The uterus now being pulled strongly forward, a similar separation of uterus from rectum is made, but not nearly so much care is required, as the distance is short and perforation of the rectum not easy.

When the opening through the cul-de-sac of Douglas is complete, the sides may be ligated and the uterus cut away; this is about the same method of "total ablation" as done by M. Guernonprez, but in cases of large myomata or myo-fibromata, especially if accompanied by small pelves, this is not an easy matter, and it requires much time, even in the most favorable cases, an item of grave import in weak, anæmic patients. At this point my modification has proven of service. The anterior and poste-

rior openings into the vagina having been quickly and satisfactorily made, the uterus is given into the hands of an assistant who pulls it upward and to one side; a Polk's clamp (such as used in vaginal hysterectomy) is inserted into the vagina close to the uterus, with one hand, while the other is within the pelvis to guide the blades into place. The whole pedicle being seen to be within the grasp of the blades, the clamp is closed, the uterus carried over to the other side, the fellow-clamp applied in the same manner, and the uterus, tumor, tubes and ovaries cut away with scissors. Irrigation with hot water is made, the parts dried, gauze drainage put into the vagina, and the abdomen closed with catgut sutures, with the usual dressings of iodoform, bichloride gauze, cotton and surgeons' plaster. The clamps are treated as in cases of vaginal hysterectomy.

As thus performed, supra-vaginal hysterectomy is scarcely more serious than vaginal, the cut through the abdominal wall adding but an insignificant amount of danger to the operation. In cases where some special reason exists for so doing, the peritonæum on the posterior wall of the bladder may be united to that of the anterior wall of the rectum by a few catgut stitches, but I have found in practice that this step is wholly unnecessary in cases where haste is required.

The Péan method of total extirpation differs from this in that it consists materially of two distinct operations, the first a supra-pubic hysterectomy, as done by Price and others; the second, a vaginal hysterectomy. The procedure is briefly this: After opening the abdomen the tumor is drawn upward by means of a long curved trocar and an elastic ligature thrown around it as near as possible to the cervix and fastened by a pair of forceps. The uterus is then resected as close to the ligature as is safe, the bladder and rectum dissected off, all the little vessels belonging to them being tied or compressed. A metal ligature is then placed below the elastic constrictor, tightened firmly and twisted by an assistant; the stump is now cut away close to the metallic band, care being taken to hollow out the mucous membrane and adjacent tissue as much as practicable, without losing the ligature; then the stump is reduced and the abdominal wound closed and

dressed. Extirpation of the neck, stump and metallic ligature is then made through the vagina by ligating on each side and cutting away after the manner of a vaginal hysterectomy. This is an excellent operation for the removal of very large fibrous, fibro-cystic or interstitial uterine tumors, but it takes much time—not less than an hour. So that by reason of serious continuance under the anæsthetic, the long exposure of the peritoneum to the air, and the aggravated shock from the operation, the mortality rate has been somewhat higher than that of supra-pubic hysterectomy with fixation of the pedicle; whereas by the method advocated in this article, the time is reduced to much less than the ordinary supra-vaginal hysterectomy, and there will be found few cases in which it cannot be practiced.

Over the methods of Martin, Bardenheuer and Guermontprez—they all doing practically the same operation as devised by Eastman, of Indianapolis—the plan adopted by myself possesses the two advantages of ease and rapidity.

As compared with supra-vaginal hysterectomy, with fixation of the stump in the abdominal wall, it possesses many points of superiority. In the first place, the latter operation is wholly unsurgical, since it leaves a stump transfixed with pins and constricted by a metallic ligature so that sloughing, suppuration and a long convalescence is certain; in the second place it leaves the cervix pressing upon the bladder, and always pulling at the cicatrix, often a source of trouble in after years; while total ablation by the method here described can be done even more quickly, hence more safely; it leaves no cervix or stump as a nidus of infection, so lessens the dangers of the operation, since when the cervix no longer exists, the vagina may be kept thoroughly disinfected, and it affords all the qualities desired for perfect drainage, viz., a dependent position and possibility of complete asepsis.

In conclusion, then, I am inclined to believe this operation is indicated in all cases enumerated by Pozzi, characterized by: "Rapid increase of the tumor; severe hæmorrhages yielding to no palliatives; ascites produced by irritation from the tumor; compression of the organs of the pelvis or abdomen, especially

the bladder and the ureters; considerable volume in the tumor, especially cystic, œdematous or suppurative degenerations; symptomatic prolapsus of the uterus, and pregnancy where the tumor would evidently be a cause of dystocia." He condemns abdominal hysterectomy in cases where there is excessive debility (because of the length of time required for performance); advanced age; many vascular adhesions, and finally complication of cancer of the cervix with tumor of the body—this last, he says, being attended with frightful mortality, since relapse is certain. I have made abdominal hysterectomy by the plan here advocated in a case of cancer of the cervix, with fibrocystic tumor of the uterus, having carefully curetted the cancer, and surrounded it with gauze before extricating it through the abdomen, but I think the Pean operation would be preferable and justifiable. I recently operated at All Saints' Hospital by this method, in a case of extreme debility, associated with marked mitral disease, the uterine trouble being sarcoma of the body of the uterus, with double tubal complications. The patient did well in every way, and I believe, therefore, that many cases, excluded by Pozzi on the ground of weakness, may still be brought within the boundary of comparative safety by this rapid method of complete extirpation of the uterus; and the mortality-rate greatly lessened in all cases where hysterectomy is indicated.

In cases of simple carcinoma of the cervix I believe this same method is preferable (by taking the uterus through the vagina instead of through the abdominal incision), because recent investigations prove that in a large proportion of all cases of cancer of the uterus there are infected points in the ovaries and tubes—hence extirpation of the uterine adnexa should always be made when the uterus is removed. This can be done by the method just described almost as quickly and fully as safely as simple vaginal hysterectomy.

# A CASE OF JEJUNOSTOMY FOR INOPERABLE CANCER OF THE STOMACH.

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THE doubtful position which this procedure holds as a means of relief in the class of cases referred to in the title, must be sufficient apology for placing it on record. The intention of the operator was to make a gastro-enterostomy, but the conditions found when the section was made precluding such anastomosis, it was deemed best to establish an opening as near the origin of the small intestine as possible. Had not the indications for speedy conclusion been supreme it would have been better to have made an end to side anastomosis by attaching the proximal end of the divided gut into an opening made in the side of the distal end, two or three inches from its cut extremity, in that way appropriating and securing the passage of the hepatic and pancreatic secretions into the alimentary canal below. If that had been done it might, for a time, have averted the tendency to death by rapidly progressive starvation. The patient was extremely emaciated before, but after the operation the changes in wastage were visible from day to day.

NOTES OF CASE BY DR. R. S. ADAMS.

Ignatius Kabainski, aged thirty-two years, naturalized German, single, baker, two years in United States, family history negative, always enjoyed good health until about six months ago, when he began to suffer from vomiting, which gradually increased until at the present time he rejects everything he takes. He first noticed a tumor in the pit of his stomach three months ago, and since then has lost forty pounds in weight.

*Physical Examination.*—Patient is poorly nourished, very much

emaciated, anæmic and cachectic. Lungs: percussion note high pitched; heart sounds feeble, liver somewhat enlarged. Between the umbilicus and the ensiform cartilage can be felt a large, hard, nodular mass, slightly mobile and insensitive to any but deep pressure. Stomach not dilated; vomits everything he takes. Specimens of ejecta examined by Dr. Thacher, the pathologist, contained no free hydrochloric acid. Urine, specific gravity 1021, alkaline, contains leucocytes and pus, neither albuminous casts nor glucose.

Peptonized food was prescribed after lavage, and a gastro-enterostomy was advised and accepted by the patient.

*Operation.*—November 11, 1892. Chloroform narcosis; the usual antiseptic precautions; the stomach was well irrigated with weak solution carbolic acid, vertical section four inches, median line, between ensiform cartilage and umbilicus, supplemented by a transverse one from lower end of first. Several enlarged glands were found in anterior ligament of liver. The whole stomach was found converted into a hard mass reaching from the cesophageal to the pyloric extremity. Any radical measure being out of the question, and the impossibility of an anastomosis being demonstrated, it was considered best to fix the jejunum in the wound. The transverse colon was drawn upward, omentum pushed to the left and kept out of the way with aseptic hot pads. The jejunum was then brought through the opening in the abdominal walls. Its lumen was closed at two points four or six inches from its origin by temporary clamps. It was divided transversely and the cut ends were secured in the middle of the vertical incision in the abdominal wall. The parietal wound above and below this was then approximated, and the patient was removed from the table.

For the first few days after the operation he was sustained by rectal alimentation, fresh beef blood, sarco-peptones and egg-albumen, but his rapidly-progressing emaciation demanded something more, and he was fed through the opening in the gut peptonized food, with the addition of pancreatin and ox-gall. Only small quantities could be retained. They were frequently repeated, but in spite of all he literally melted away and died fourteen days after the operation. Every effort was made to obtain an autopsy, but the interference of his friends prevailed, and it could not be had.

A CASE OF LARGE ANEURISM OF THE EXTERNAL ILIAC  
ARTERY APPARENTLY CURED BY MACEWEN'S  
METHOD OF NEEDLING.

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THE patient's name is J. W. Aged thirty-five. Boodbinder : moderate drinker ; family history negative. Had a venereal sore on penis, with the history of a soft chancre, some years ago. About twenty-two months ago, while lifting a heavy weight, that for better support was pressed against his right inguinal region, he experienced a tearing sensation at that situation. The sensation was quickly followed by a pulsating tumor above Poupart's ligament.

He visited the Hospital for the Ruptured and Crippled under the impression that he was suffering from hernia, but was referred to the Polyclinic, at which place he was seen by a surgeon, who put him in bed and introduced something into the tumor, which he understood to be wire. However, he said that he experienced no benefit from this measure, which plan was quickly followed by the application of "weight" directly to the tumor, but without noticeable (to him) benefit. Owing to closure of the hospital he returned home, keeping the weight applied, but without advantage.

On the 30th of July, 1891, he went to St. Vincent's Hospital, at which time he came under my notice. At this time he had a large aneurismal tumor, connected apparently with the external iliac artery of the right side. In view of the past history of the treatment it was deemed wise to employ the needling process of Macewen, before attempting any other measure. At this time he was seen in consultation by Drs. Stephen Smith and Gouley, who concurred in the diagnosis.

On the 9th of July needles were employed after the manner of Macewen. These needles were made for the purpose, one  $\frac{1}{2}$  mm., one  $\frac{3}{4}$  mm., and one 1 mm. in diameter. In the presence of Drs. Smith, Gouley, Girdner, and the members of the house staff two ( $\frac{1}{2}$  and  $\frac{3}{4}$  mm.) were carried into the tumor to the opposite side. It was difficult, indeed, to distinguish whether or not the opposite side of



the tumor was infringed on by the needle points, owing to their small diameters and flexibility, and the thickness of the walls of the tumor. However, after half an hour's teasing of the lining of the tumor at different points, two of the needles were allowed to remain *in situ* for twenty-four hours, and then removed. No appreciable change took place in the size, density, bruit or pulsation of the growth resulting from this attempt.

On the 15th (six days later) the needles were again introduced, this time by Dr. Stephen Smith, as I could not be present. Larger needles at this time, "1 mm. and 1½ mm.," were used. They were introduced and manipulated in a similar manner as in the first instance, but were permitted to remain forty-eight hours instead of twenty-four, when they were removed by myself. Within a week following this introduction the bruit lessened, and at times could be scarcely heard, and finally disappeared entirely within two weeks. The previously severe pain, due to pressure, lessened, the tumor hardened, and finally, within less than three weeks, no evidence whatever of pulsation could be detected in it. Since this time slow contraction has taken place, but as yet the growth appears formidable in size; all pain ceased long since, and the patient has been around the wards of Bellevue, to which hospital he was transferred some months ago. It is proper to say that at the time the pulsation and bruit were scarcely perceptible, the tumor appeared to enlarge rapidly in the circumference, due as was then supposed to a leak in the sac. However, since then, as before remarked, nothing of unfavorable import has appeared.

The tumor now extends nearly across the brim of the pelvis, and encroaches upon the region of the umbilicus, then involving the upper portion of Scarpa's triangle. Rectal examination discloses no features of aneurismal nature, except the hard, elastic remains of what was once a much larger tumor, enlivened with the phenomena of aneurismal activity.

Whether the needles cured this case, or cure was coincident with that measure I cannot say. At all events the closeness of their associations, together with the good results of this method already reported by Macewen, entitles it to our consideration, and perhaps to the belief that the benefit noted came from the treatment alone in this case.

Since reading the above, careful examination reveals returning pulsation of such a mild type as to lead to doubt on the part of some if pulsation be present at all. However, I am convinced of its presence. No other aneurismal manifestation is noticeable.

# A CASE OF CURED ANEURISM OF THE ABDOMINAL AORTA SIMULATING A SOLID TUMOR.<sup>1</sup>

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**S**URGICAL diseases within the abdomen are more difficult to diagnosticate than in any other portion of the body except within the cranium. As my experience increases I am more and more convinced of the fact that one can comparatively rarely make a correct diagnosis of an intra-abdominal lesion without an exploratory operation. In these cases I am seldom satisfied to form an opinion on which to act until I have examined the case under an anæsthetic. This is a rule which should be followed: When the surgeon can reasonably expect to find a condition which will require operative treatment, the final and determining examination should be made with the patient under ether and prepared for operation, and if this examination indicates the necessity for an operation it can be proceeded with at once, thus avoiding the shock of a second etherization. These remarks are applicable to all surgical diseases within the abdomen, but particularly to tumors. Many diseases, appendicitis for instance, give sufficient symptoms, subjective and objective, to lead to a pretty accurate knowledge of the condition causing them, but a slowly developing tumor generally gives no symptoms which can aid very materially in determining its exact nature and origin. The only symptoms of a tumor originating in one organ may be those produced by its pressure on another organ, and thus one may be entirely misled as to its origin.

I feel inclined, as a rule, to consider my laparotomies as exploratory operations. Too often is it the case that an operator will start with a definite plan of operation, having a positive, though

<sup>1</sup> Read before the New York Surgical Society, January 25, 1893.

generally mistaken, opinion as to the condition he has to treat ; not finding the condition he expected does not always deter him from proceeding as he had planned to. This is most noticeable in the treatment of diseases of the ovaries and their tubes. Were the operator proceeding with the idea that he would find out the nature of the trouble after he had opened the abdomen, and then decide upon a plan of treatment, his judgment would be much freer than if he had to overcome a preconceived and proclaimed opinion.

I will subjoin the history of a case of abdominal tumor which illustrates the difficulty of making a correct diagnosis of diseases in this region.

The patient, a man fifty-one years of age, was admitted to the medical side of the colored hospital on July 20, 1891. He had been fairly well until about ten months previous to this date, when the present trouble began. He had had several of the ordinary diseases of childhood, also inflammatory rheumatism and diphtheria. He denied having had syphilis, and no evidence of it could be found when admitted to the hospital. He had suffered for about ten months from a pretty severe lumbar pain and from constant dyspepsia. He was considerably emaciated, had a badly-coated tongue. His pulse was about 100 and his temperature was slightly elevated.

The patient was at first under the care of an attending physician who was about ending his term of service ; he was shortly succeeded by his alternate. On examination this first physician found a tumor in the upper part of the umbilical region. He found it to have a distinct expanding pulsation and a bruit with the first sound of the heart. He made a diagnosis of aneurism of the abdominal aorta. The physician who succeeded the first attending a few weeks after the patient's admission to the hospital, decided that the tumor was not an aneurism. He found the pulsations in the tumor were not distinctly expanding and that the aorta could be felt pulsating independently from it, apparently below and to the left.

I saw the patient on January 5, 1892. His appearance and pulse suggested marasmus. The tumor could be felt very readily, and it could be made out that it was a rounded, elongated mass, extending well forward. The free end was quite superficial. The attached end seemed broader, and extended deep down into the lower part of the

epigastrium. It pulsated with the aorta; there was an indistinct sensation of expanding to it; a loud bruit could be heard, especially to the left. My impression was that it was a cyst resting on the aorta, and judging from the digestive disturbance and the patient's emaciation, I thought it might be a cyst of the pancreas. The urine and feces were examined for pancreatic disease with negative results. I advised an exploratory laparotomy. This was done on January 9. The abdomen was opened in the median line, and the superficial end of the tumor was readily found. The tumor was intimately attached to the omentum, and the intestines by firm, dense adhesions. These adhesions were separated with great difficulty.

The tumor was but partly freed, as it did not seem safe to proceed further on account of the amount and the density of the adhesions. The tumor was long and tapering a little to the superficial end. It was very elastic, and presented all the appearance of a tense, thick wall cyst. It could be followed down the pancreas, which could be felt to be firmly attached to it. The base of the tumor rested firmly on the aorta, and, of course, pulsated forcibly with it. I was almost as uncertain of my diagnosis now as before, but I was still inclined to think it was a cyst of the pancreas, whose wall was rendered markedly thick by the layers of organized lymph. I partly closed the abdominal wall, leaving the end of the tumor in the wound held by sutures, intending to explore its interior after the abdominal cavity had been shut off by adhesions to the tumor. The patient left the operating room in fair condition, and I was greatly surprised to hear that he had died six hours after the operation. The cause of death was shock.

An autopsy was made and confirmed the conditions found at the operation.

The tumor was firmly attached to the pancreas, which was unfortunately torn off and not removed with the tumor. It was further found that it was a sacculated aneurism of the aorta. Unfortunately, the aorta was cut close to the aneurism, and none of its branches were preserved, so that it was difficult, when I saw the specimen, to determine the exact location. I think it was just below the superior mesenteric artery. The tumor weighed about a pound. It was filled with solid laminated fibrin, and was a cured aneurism, at least temporarily.

I have reported this case because it is one of a good deal of

interest, and is a unique one. It is certainly very remarkable to find an aneurism of a vessel of this size in which coagulation has taken place. The orifice to this sac was large, and the force of the blood current at this point is very great. Undoubtedly the cure was effected by the manipulations of repeated examinations, aided by rest in bed.

This case was at first an easy one to diagnose, and had the first physician continued in attendance he would doubtless have recognized the true state of affairs when the change took place. Later, the characteristics of aneurism were wanting, and the symptoms pointed entirely to disease of the digestive tract; and the situation of the tumor rendered it probable that the pancreas was the organ involved.

## TRANSACTIONS OF THE NEW YORK SURGICAL SOCIETY.

*Stated Meeting, January 11, 1893.*

### PYONEPHROSIS : NEPHRECTOMY.

Dr. CHARLES K. BRIDDON presented a young woman, aged eighteen years, with the following history : For some months previous to entering the Presbyterian Hospital she had suffered from vague pains in her right lumbar region. Latterly these had become severe and constant, and the aggravation of pain was associated with some fever. The urine was generally of high specific gravity, contained small amounts of albumen, occasionally traces of glucose, and always varying but considerable amounts of pus. A tumor was also discovered occupying the site of the right kidney.

November 25th she was subjected to operation by Dr. Briddon. Ether narcosis. Incision six inches along the outer border of the right erector spinæ. When the deep lumbar fascia was opened the colon was found lying to the outer side of the kidney, and in separating it internally the peritonæum was accidentally opened, and immediately closed by chromicised gut suture. The patient being very stout the vertical incision was supplemented by two transverse incisions of four inches each, and this trap-door flap was reflected toward the middle line, affording ample, but not more than sufficient, room for the subsequent proceedings. The enucleation of the kidney was then proceeded with. Outside of the capsule this was extremely difficult on account of the intimate nature of the adhesions. In the vicinity of the lower end of the organ a pus cavity was opened. This was carefully cleaned out and the separation continued until the pedicle was isolated and securely tied with a strong silk ligature. The wound was very deep ; it was difficult to place the ligature and a very small portion of renal tissue was left in the stump to prevent slipping of the ligature.

A tamponnade of iodoform gauze was fixed in the wound, which was partially approximated by suture. The organ was found to be the seat of small multiple abscesses, and following is the report of Dr.

John S. Thacher, pathologist of the hospital: "Marked diffuse inflammation. The spots may be properly called commencing abscesses."

The after history of the case was uneventful. During the first twenty-four hours she passed thirteen ounces of urine: December 3, twenty-five ounces; December 12, thirty-five ounces; and at present date, January 10, she is averaging between forty and fifty ounces, with only slight traces of pus. There is a small sinus which, it is presumed, leads down to the stump; it discharges only a very small amount of pus, and that is diminishing daily.

Dr. LANGE presented a specimen, consisting of the left kidney of a woman from whom, six years previously, he had removed the uterus and ovaries for a large fibroma. At the operation the elastic ligature was used, and it passed out about a year later through the vagina. She enjoyed very good health until the spring of last year, when she became feverish without apparent cause. She also had chills from time to time. There was never any pain to speak of. She noticed very soon that her urine had become muddy. Being at that time in Europe, she was treated there by one doctor for malaria and by another for bladder trouble. She then again came under the care of Dr. Lange. At the end of October he found the urine loaded with pus, of neutral reaction and low specific gravity. She had a fever with sometimes a slight chill, and had lost considerable flesh. The right kidney could be distinctly felt, was movable and sometimes descended low enough to be accessible to palpation all over its anterior surface. It did not seem to be enlarged or painful. The left kidney could not be found at all, yet on deep pressure she had some pain in that region; otherwise she had never had any pain. There had been no blood in the urine. Microscopical examination of it revealed simply pus and some granular material. Repeated examinations with the cystoscope demonstrated the mouth of the right ureter discharging clear urine. The ureter on the left side could not be seen on account of a swelling or projection of the mucous membrane which concealed the ureter. Near by were several apparently superficial erosions of the bladder. Iodoform, in powder, when thrown on these would adhere very closely, and a light touch would cause them to bleed. Although the thought was entertained that they were of tubercular origin, at no time when the urine was examined could tubercle bacilli be found in the sediment. Supposing she might have tubercular affection of the bladder, she was treated

by guaiacol for some time, and other local and general measures were diligently applied, yet her condition did not improve. Short pieces would pass with the urine at times, which, when examined under the microscope, showed nothing but pus detritus. Supposing the left kidney to be the site of formation of the pus lumps, an exploratory incision was made which revealed the organ very large and the upper half much diseased. Although greatly enlarged, the kidney had not been accessible to the touch for the reason that it extended high up under the diaphragm, encroaching on the cavity of the thorax. The kidney was so intimately connected with the diaphragm that he was unable to detach it, though the eleventh and twelfth ribs had been excised, and during the manipulations a large abscess broke, which apparently had been in the substance of the kidney. Finally, in order to get the organ out, it was necessary to go into its capsule. A portion of the capsule, with a little of the upper end of the organ, were left until removed by scissors and forceps. The wound having become swamped with pus, it was left entirely open. The patient made a very good recovery, had fever less than three weeks and now, six weeks after the operation, the general condition is much improved. Only a small sinus leads down to the diaphragm, and there is a larger superficial wound.

As will be seen by the specimen, the kidney, although having stood long in alcohol, is still twice the normal size. In the upper portion are a large number of small abscesses. Fixation of the kidney under the diaphragm is a serious obstacle with reference to technique, and has led the reporter to do intracapsular removal several times. The fact in this case which is most surprising is that the kidney contained a stone when there had been no symptoms, no pain to call attention to this side. There had never been hæmorrhage in the urine, and no crystals were ever found. In his experience in most of the cases in which he has found stone in the kidney he had not been led to assume its presence by the symptoms, and in some cases in which he had felt almost sure a stone would be found there had proved to be none.

#### SUPPURATION OF OMENTAL STUMP AFTER OPERATIONS FOR HERNIA.

Dr. WILLIAM T. BELL then read the paper of the evening, entitled *The Accidents which may follow Removal of the Omentum in Operations for Hernia.* (See page 269.)



Dr. ROBERT ABBE said that this mishap of suppuration of the pedicle of the omentum, when it has been returned into the peritoneal cavity he had met with also, but it seemed to him that it was to be accounted for only on the supposition of infection of the stump. It does not seem possible, or probable at any rate, that a stump of even large size of fatty omentum is likely to suppurate when reduced into the peritoneal cavity unless there be some infection. The very fact that many large stumps are reduced and never suppurate proves that there must be some contamination when one does. He had never hesitated to return a stump of considerable size because of its bulk if he felt satisfied of the asepsis. Czerny showed that perfectly independent masses of uncontaminated tissue, such even as muscular or cancerous masses in large bulk, can be introduced into the free peritoneal cavity, and will be absorbed without suppuration. His own feeling has been that the contamination comes from the silk ligature in the vast majority of cases. If the silk is absolutely aseptic, we will almost surely have a non-suppurating stump. The tumefaction which occurs and disappears without suppuration is simply lymph and serous exudation, which is not uncommon, surrounding any inflamed portion. Natural reparative inflammation may go on to the formation of lymph and serous exudation. Multiple small ligatures of a large pedicle are very important, and catgut can be used with absolute security. In fatty pedicles we must tie with greater firmness than in other tissues, because the fat atrophies so quickly, even under the tightening of the ligature, so that a vessel of considerable size may in a very few minutes become open enough to give passage to blood when it did not bleed at the time the ligature was tightened. All pedicle ligatures upon fatty tissue should be tied with a triple knot, because the fat makes the knot so slippery.

Dr. F. W. MURRAY remarked that in tying off pedicles of the omentum he had always used catgut, and had never had any trouble. He always ties off small portions at a time, and also takes the precaution to ligate separately any vessels that are in sight. As to the cause of inflammation coming on a few days after the operation, it must be due to some defect in the asepsis. By the use of catgut, which can be sterilized very thoroughly by present methods, the danger would be much less than with silk. He agreed with Dr. Bull in recommending the use of only catgut in tying these stumps.

Dr. C. H. BRIDGON doubted very much whether his aseptic precautions had been any greater than, possibly not as great as those of

Dr. Bull. He was quite certain that he had ligated large masses of omentum in days when asepsis was not born, much less perfected, yet he had never seen a case of localized peritonitis follow ligation of the stump of the omentum either when it has been done en masse, or in chain ligatures. Unless suppuration has followed a long period after the operation, when the case had ceased to be under his observation, nothing of the kind has happened.

### TECHNIQUE OF INTESTINAL ANASTOMOSIS.

Dr. DAWBARN then read a paper entitled, *Vegetable Plates in Bowel and Stomach Surgery; a Discussion of Proper Technique.* (See page 147.)

Dr. ROBERT ABBE said that the sweeping way in which the author had thrown aside the various methods which preceded his is hardly justified by the record of cases which have been treated successfully by these various methods. Speaking simply for the catgut rings which have been used by Dr. Bull, Dr. Weir, Dr. McBurney and others, including himself, on a number of patients, in the great majority of cases they have not been flexible in the lumen of the intestine so as to be unavailable, but have succeeded admirably in their mission; have remained firm and held the bowels in apposition, and thereby perfect anastomosis has been accomplished. There is an objection to introducing a large mass of foreign substance, like this potato, in the lumen of the intestine at some points. It is likely to be a source either of occlusion or of irritation to the bowel.

With regard to the technique of the operative procedure which the author has devised, there are flaws which must be corrected or changed. Leaving the intestine uncut until after the plates are in position, and then cutting the two thicknesses of the bowel between the rings through one of the end openings, would in the human bowel, or certainly where the anastomosis was between the stomach and bowel, be a very risky procedure on account of hæmorrhage. A method that was good for anything must be equally applicable in gastro-enterostomy after resection of the pylorus, or in uniting two portions of small intestine. In cutting the bowel there is always hæmorrhage enough to be a matter of anxiety, and he should hesitate even if the intestine were cut between potato plates to leave that cut surface without being very carefully watched. The author says, however, that the cut edge can be seen from the open ends, and can be pinched if there be bleeding points. He thought this, added to the general mussiness of the operation, makes it less attractive among

clean surgical procedures, and it seemed to him it would be wiser to cut before making anastomosis.

As regards loss of time a few minutes, say ten minutes, difference between one procedure and another is not so important. What we need in intestinal surgery is something which is absolutely safe. These operations should not be done with haste in emergency cases. It is far better, where there is great obstruction with necessity for anastomosis, that an artificial anus be made first and the patient be restored to good condition before undertaking the major operation. If the patient be in good condition an operation on abdominal viscera lasting an hour or even longer can be borne. It is not more grave than most operations are on these viscera when the time for operating can be selected. Regarding prolonged exposure of any large amount of the bowel, that does not take place in anastomosis. It is a rare thing not to be able to draw out just enough of the bowel for the operative procedure, while the rest is protected and concealed by towels, etc. The slight exposure which takes place is of much less consequence than the need of perfect coaptation of the edges and prevention of leakage.

As regards testing the suture by hydrostatic pressure within the bowel after anastomosis, he could not conceive of leakage if the operation had been done properly. Hence this step in the technique is superfluous, and if superfluous bad. In the case in which he had injected the bladder after sewing up an opening left by tearing away adherent bowel, he had injected it not so much to test the opening which had been closed, but to assure himself that there was not another. A properly applied Lembert suture to an incision which one can see, especially if a double line of sutures has been taken, cannot leak for the reason that the inverted edges of the mucous membrane act as a valve, which becomes tighter as pressure within is increased.

Dr. WILLIAM T. BULL stated that he was thoroughly convinced that we can accomplish either end-to-end anastomosis or lateral anastomosis without the aid of any of these fixtures. The one which he had used had, it is true, proven very satisfactory, that is, the catgut rings of Abbe, and if he were again going to resort to any such artificial aid, his choice would fall on the rings, not but that in a case of emergency he might make use of this device of Dr. Dawbarn's which, with the accompanying technique, has been worked out admirably, but he agreed with Dr. Abbe that in most emergency cases one

had better not attempt anastomosis, neither end-to-end nor lateral, but rely on making an artificial anus, putting off joining the intestines end-to-end. He also seconded what Dr. Abbe had said with reference to time. The time element is nothing like so important as Dr. Dawbarn has made it out. Certainly in half an hour or forty-five minutes one can conclude the part of the operation which belongs strictly to joining the intestines together and re-establishing the lumen, and that added to the time for exposing the field of operation, all conducted in a leisurely and deliberate manner, is certainly not too great for any patient to stand when the time for operation has been selected. In the operation which Dr. Dawbarn quoted, his criticism was fairly applicable: it was an operation which had lasted three hours, at the end of which time the intestine was treated by means of plates, when it probably would have been a great deal better to have made an artificial anus.

DR. DAWBARN, in closing the discussion, said, knowing as he did the view taken by Dr. Bull and Dr. Abbe on this same subject on a previous occasion, he could hardly expect them to express a different opinion now from what they had done then. Nevertheless, he believed that in course of time they would agree with him. Such a thing as change of fashions in surgery we have all seen a good deal of.

As to some of the points mentioned he hardly knew what Dr. Abbe meant by the term *mussiness*; therefore he did not know how to reply to it. A potato is hardly a mussy thing. What we ought to consider is safety, and he thought that there could be no difference of opinion as to the greater relative safety of making the anastomosis incision after, rather than before, the suturing. Safety is decidedly more important than sentimental ideas of mussiness. As to Dr. Abbe's bladder case, if he will refresh his memory by referring to his own article (which was quoted), he will find that the object he had then in injecting the bladder was *not* to see if there were other tears, but *to test his line of sutures*. Perhaps, although he now regards his own sutures as so entirely perfect that there is no necessity for testing them in lateral anastomosis, he will agree that the work of some operators might not be so trustworthy: or, at any rate, having less confidence in themselves they might feel easier if the test had been made.

Both of the speakers regard the question of leaving the abdomen open ten or fifteen minutes more as a trivial affair, comparatively

speaking. There is where he would take issue with them, and that is the point on which the whole question turns. If these two operations (that with the plates and that without) were of about equal length, then he should possibly agree that simple suturing was the thing to do. But they are not of equal length. Any unprejudiced person using the technique he had described would find that the abdomen will remain open ten to fifteen minutes less time.

Further, he thought any such person looking over the statistics of abdominal operations will admit that those surgeons who operate the most rapidly have the best average results. The point of speed in abdominal work is of the utmost importance. Leisurely work here is wrong in the extreme.

As to catgut rings there is no question that with their use a number of cases have recovered. These plates are not criticised as being of no use. The statement made was that any form of catgut ring immersed in water or semi-liquid feces, at the temperature of the body, will become flabby, and utterly lose resisting power in a short time. Of course, in the cases operated upon, the abdomen was not left open, so that they could judge how long the plates retained their firmness. In every case in which Abbe's catgut rings have been used suturing around them has also been done, and that is what largely saved the patients, rather than the rings. There is comparatively no resisting power whatever in the rings after they have been in warm water a short time. On the other hand these potato plates, under identical conditions, become more and more rigid for several hours. Their other advantages over plates and rings of other kinds speak for themselves.

#### REMOVAL OF THE RECTUM FOR NON-MALIGNANT ULCERATION.

Dr. FREDERICK LANGE presented a specimen consisting of a rectum which had been removed for an ulceration of a non-malignant nature. He presented the specimen because this form of ulceration may still be disputed by some as a possible indication for excision.

The specimen came from a young man twenty-six years of age, on whom, about five years ago, he had extirpated from the inguinal region what he thought to be a bubo due to a chancroid affection. It was a small ulcer which had healed without any induration, and which

had given rise to a large lymphatic swelling, whose elements were such as are commonly seen in such cases. The patient was not seen again for almost five years, during which time no secondary symptoms pointing to syphilitic infection manifested themselves. In March, 1892, he returned, having already been under treatment somewhere during several months for matter discharged from the rectum and for ulceration. He had almost entirely lost control of the bowel, and suffered extremely from tenesmus and stinking discharges, consisting largely of pus and blood. He had been feverish, and was much run down. There were a number of ulcers around the anus and several fistulous tracks leading into the ischio-rectal space and into the rectum. The rectum was the seat of very extensive ulceration, extending as far up as one could feel. The whole mucous surface was raw, bled easily, and was apparently either entirely void of mucous membrane or possessed of it only in small patches without the epithelial layer.

At that time he split up the fistulous openings, dividing the sphincter, and scraping the ulcerating surfaces, then inserting a rubber tube surrounded by iodoform gauze, extending beyond the diseased surface. The tube had to be changed after each movement, which was about twice a day. Irrigation and washing tended to relieve irritation. The patient was also put on a general antisyphilitic treatment. Some improvement resulted. During the summer he relied upon irrigation of his rectum, which he did by means of two tubes, one without lateral holes for the entrance, the other for the exit of the water. In the autumn the external sores had partly healed, the fissure tract had cicatrized entirely, but the ulcers within the rectum existed to about the same extent as at first. It had been previously observed that in some places the patches attempted to heal, but after some weeks the scars would break open again. So finally Lange decided to remove the diseased portion, and did so by the usual posterior incision, including the extirpation of the coccyx. The gut was shelled out of the sphincter ring, or what remained of the sphincter, for it had been largely destroyed by suppuration, and the rectum was extirpated far above the diseased portion, for the reason that the diseased portion extended about six inches above the anus, or to the part which, by its anatomical connections, does not permit of any pulling down of the intestine. He therefore went up about five inches further, to the movable sigmoid flexure, which can be pulled down a certain distance with ease. However, it seems that the length of the sigmoid flexure,

or rather of the mesocolon to which it is attached, varies a good deal, and, as in some other cases, so in this one. He was unable to pull the gut down far enough to bring it in contact with the external integument at the anal muscular ring. It was necessary to remove some of the integument on account of scar tissue and some small ulcers which still existed. Consequently an additional plastic operation was made, making an incision from one tuber ischii to the other, and in front of the anus, so that the thick mass or bridge of tissue about the anus could be moved up an inch and a half or two inches. Union, however, did not take place. The patient's health was reduced, and at least two-thirds of the circumference of the parts suppurated. There was a circumscribed necrosis of the mucous membrane just at the place where it was most important, namely, at the posterior aspect of the anus, where the muscular rings had been united, so that everything separated except a small bridge of tissue, and the gut, became narrowed by the formation of scar tissue. Bougies were used, but the cicatricial contraction was so powerful that the discharge of feces became so difficult that another operation had to be resorted to. Perhaps in consequence of too intense use of bougies, pressure necrosis of the mucous membrane had occurred, so that there was renewal of ulceration, necessitating removal of another two inches of intestine to get into absolutely healthy parts. Under these circumstances the idea of having muscular closure had to be given up, since it was not possible to bring the muscular ring as high up as that, but a plastic operation was made by which was secured the inversion of the external integument to such an extent as to form a funnel-like opening with approximation of the edges of the mucous membrane and integument. This healed tolerably well, with the exception of a small portion, which has finally now cicatrized entirely. Of course, what is left of the sphincter is entirely without function, and the patient is unable to control his bowels when loose, but under ordinary conditions he spends from half to three-quarters of an hour at the morning movement and is not troubled the rest of the day. His general condition has improved very much. The discharge of pus has entirely ceased, and he has gained at least twenty pounds since the operation, which is considerable for a man of small build.

In the specimen may be seen, especially near the anus, a number of elevations and depressions. The mucous surface had been destroyed in all the specimens put under the microscope, and was replaced by a kind of granulation tissue, with at some points fibrous tissue. There was a peculiar brittleness of the vessels, so that the ligatures cut through very easily.

## TOOTH-BEARING DERMOID CYST OF THE OVARY.

DR. F. KAMMERER presented a dermoid cyst of the ovary which contained beside the usual contents of such cysts, a mass of bone from which projected a clump of eight irregularly placed teeth, including samples of the incisor, canine, bicuspid and molar varieties. (See Fig. 1.) This had been removed from a young woman of twenty-eight. The patient had been suffering from irregular menstruation and pain for some time; an inflammatory condition in the right parametrium, evidently tending to perforation into the vagina, was discovered by her physician, and an incision was made into the left fornix vaginæ, emitting a large quantity of pus. This was drained. When Dr. Kammerer saw the patient in consultation, fever had again



FIG. 1. Dr. Kammerer's Tooth-Bearing Dermoid Cyst of the Ovary. Cyst Laid Open to Show Site and Arrangement of Teeth.

set in, and a T-shaped drainage tube was re-inserted into the abscess-cavity from the vagina, and retained there for many weeks, and the cavity was irrigated through it with antiseptic fluids.

On one occasion a mass of hair was discovered in the irrigation fluid, establishing the diagnosis of a suppurative cyst with perforation into the vagina. Laparotomy was done after the very offensive discharge from the vagina had ceased under the above-mentioned treatment, and the cyst was removed, without much difficulty, after the separation of some firm intestinal adhesions. The opening into the vagina was left to itself, and a tampon introduced into the abdominal cavity from the lower angle of the wound. The case did well, but the speaker had much trouble with a vaginal fistula that remained for many months, and which, he thought, might have been avoided if drainage had been established through the vagina also.



## TRANSACTIONS OF THE NEW YORK SURGICAL SOCIETY.

*Stated Meeting, January 25, 1893.*

JOHN A. WYETH, M.D., Vice-President, in the Chair.

### JACKSONIAN EPILEPSY ; OLD DEPRESSED FRACTURE OF SKULL ; TREPHINING.

DR. CHARLES K. BRIDGON presented a man, forty-nine years of age, with the following history :

W. R., admitted to Presbyterian Hospital, New York, November 28, 1892. March 27, 1890, was injured by being hit several times over *left* side of face and head with a club. He was unconscious for two days with some delirium, and then it was found that he was hemiplegic on the right side. On March 30 violent twitchings of right facial muscles occurred, which continued at intervals until the following day. The patient recovered slowly, and on April 26, four weeks after injury, was able to return to work in good condition, mentally and physically. He remained well and at work until September, 1891, when he stopped work on account of headaches, vertigo, etc. On November 2, 1891, he had a general convulsion, followed by twitching of facial muscles, and during the next three weeks he had several convulsions, beginning generally in the right side of the face and extending to the right arm and leg. His mental state was childish; he was unable to read or write at this time. Improvement then began, the patient, however, having nearly weekly attacks of twitching of the right facial muscles, sometimes extending to the right arm, until November 28, 1892, when he was admitted to the hospital. On admission temperature, 99°; pulse and respiration normal; urine negative; no heart murmur; eyes, no structural trouble; vision good when error of myopia corrected; visual field normal. Patient certainly showed evidences of right hemiparesis; face did not act evenly; he moved slowly, and limped slightly in walking; he was mentally very dull; could not follow rapid conversation or answer questions put rapidly; *hesitated much in expressing his words*, and had much

difficulty in recalling the words which he wanted to use. He was able to enunciate clearly; could read, write and copy, but in talking made mistakes. Sensation was good to all tests, and there was no ataxia of motion. There was a depressed fracture of the skull to be felt through the skin about two and a half inches in length, extending from above downward and forward over speech and face areas.

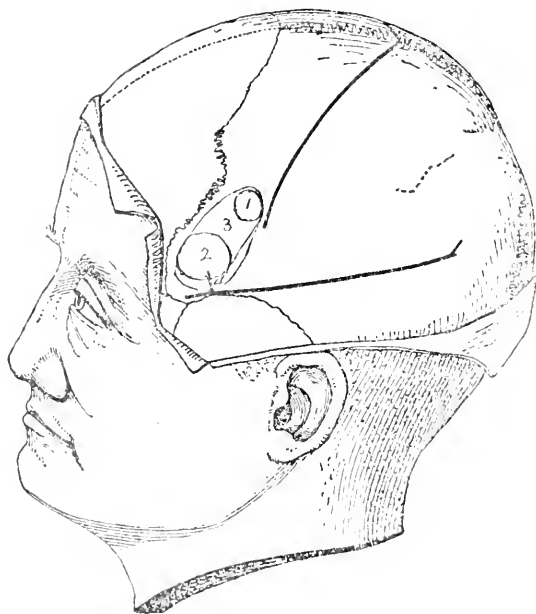


FIG. 1.—LOCATION OF TREPHINING.

- |                            |                    |                                                   |
|----------------------------|--------------------|---------------------------------------------------|
| 1 First trephine opening,  | $\frac{1}{2}$ inch | } $2\frac{1}{3}$ inches by $1\frac{1}{2}$ inches. |
| 2 Second " "               | 1 "                |                                                   |
| 3 Bridge of bone cut away, | $\frac{1}{2}$ "    |                                                   |
| 4 Enlargement downward,    | $\frac{1}{3}$ "    |                                                   |

*Operation.* — December 19; chloroform narcosis. Magendie's solution of morphia, grt. viii, given previous to anaesthesia. Patient's head having been carefully shaved, and the fissures of Rolando and Sylvius having been marked off, a semicircular incision was made about five inches in length above the area for trephining. The exact spot of face centre was determined and marked off on the skull by a bradawl puncture. The flap of scalp was then dissected off, the bone

denuded of periosteum, and two spots for trephining selected, one being over the face centre, and the other somewhat lower and further forward, nearer the fracture. When the buttons were removed the dura was found pulsating normally. The openings thus made were connected and enlarged, exposing an area two and a half by one and a half inches. The dura mater was then divided and reflected, and was found to be at least two-thirds thicker than normal. It was picked up with forceps, incised, and a flap of it turned down, thus exposing the

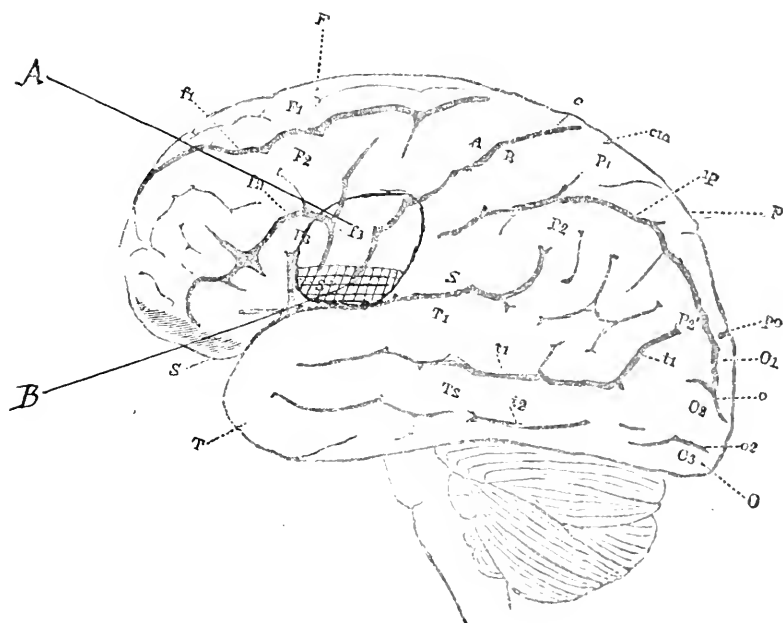


FIG. 2.

*A*.—Area of brain exposed.

*B*.—Area of localized meningitis, with connective tissue formation.

pia mater beneath, which was found to be also much thickened. No cyst was found, but in the lower half of the opening there appeared to be a depression in the brain substance, with some elevation surrounding it. In the pia mater a mass of connective tissue, resembling a honeycomb in appearance, was noticed, which was closely adherent to the brain cortex. This was probably the remains of a surface clot, or of the attempt of nature to repair destroyed brain tissue beneath

the seat of fracture. It filled in a deep fissure, and was adherent to the brain convolution bordering the upper side of this fissure. When this tissue was divided it was impossible to dissect it away from the brain, and a slight incision into the brain substance demonstrated a marked thinning of the cortex at this area. It was evident that subsequent to the original injury a chronic localized meningitis, with production of much new connective tissue, had taken place, leaving a thick mass and a partly destroyed brain cortex. It seemed impossible to remove this mass of connective tissue without destroying brain substance. Brain about the mass appeared to be healthy. Dr. Starr, the consulting neurologist, was satisfied that further procedure was useless. Dura mater sutured and scalp sutured: primary union in wound. Two slight twitchings of facial muscles occurred on the following day: since then uninterrupted recovery.

DR. JOHN D. RUSHMORE said that those cases of epilepsy which are operated upon and reported early, are very apt, later, to give a history of recurrence. A case was reported in *The American Journal of the Medical Sciences*, November, 1888, p. 477, as one of successful operation. The operation, indeed, was a success, and the patient remained free from epileptic seizures a year. They then returned, and the patient has just left the Brooklyn hospital (where he came from Philadelphia) in exactly the same condition he was in before the operation. A year and a half to two years must elapse before we can speak of the treatment as being successful.

DR. BRIDDON disclaimed any idea of this being a successful case as to the remote issue. He had not the slightest doubt but that the man will be as bad off in a few months as he was before the operation. The conclusion of the report simply refers to his condition when he left the hospital.

DR. JOHN A. WYETH had reported a case, operated upon two years ago, almost identical with Dr. Briddon's, except that there had been no traumatism. The patient was then thirty-four years of age, and had had a severe attack of meningitis when three years old, which was followed by epilepsy. He had had attacks all through childhood and youth, and at the time he operated upon him he would have as many as ten attacks or more a day. They would begin by a twitching in the left wrist, and it was at the advice of a neurologist, Dr. Landon Carter Gray, that he operated. The condition found was analogous to that described by Dr. Briddon: there was a depression in the brain which was bleached in comparison with the sur-

rounding brain tissue, the pia was very adherent at the point of depression, and was dissected out, and some of the thin cortex just beneath was sliced off in the dissection. The immediate result was partial paralysis, especially of the wrist and forearm, but after about three months this disappeared, and the patient had no convulsions for about three months, then a convulsion took place, and recurred about every week or two, but his mental condition has greatly improved, the convulsions are much less frequent than before the operation, and are not so severe.

#### BILIARY COLIC DUE TO ADHESIONS.

Dr. KAMMERER presented a woman, aged thirty years, whom he had operated upon for recurrent attacks of biliary colic. The patient had had typhoid fever three years ago, but has never had other sickness. Since her illness she has been subject to attacks of severe pain below the right shoulder blade, irradiating to the upper posterior part of the abdomen, coming on about every three or four months and lasting two days; the patient was feverish, and was compelled to take to bed during these attacks. About a year ago they became more frequent and the pain more severe, especially in the abdomen in the region of the liver. After these attacks the patient was always slightly jaundiced for a few days. She entered the hospital in March of last year, where, in spite of all treatment, her condition became gradually worse until September. Then she weighed only 98 pounds, whereas she weighed 147 pounds in January last; the attacks came on every eight to ten days, with temperature running up to  $103^{\circ}$ – $104^{\circ}$ ; icterus was very much marked during and after such attacks. An examination of the region of the liver showed the latter to be much enlarged, but palpation failed to detect a distended gall bladder at this stage; gall stones had never been passed. An exploratory incision seemed justified and was resorted to, using the transverse incision recommended by Courvoisier. On opening the abdominal cavity extensive adhesions were found between the gall bladder and the transverse colon, the omentum and pylorus, which were separated without much difficulty. The liver was raised upward and a thorough search made for stones in the various ducts, but nothing was found. The gall bladder itself was empty. The abdominal cavity was therefore closed without drainage. The patient made a good recovery. The operation was done on September 12. Patient had one attack on October 5 and 6 similar to her previous attacks, but since then none. She has

gained about 29 pounds since the operation, weighing at present 127 pounds. Now and then, on much muscular exertion, she has some pain in the region of the liver, but all the other symptoms have disappeared. The speaker thought this was one of the interesting cases referred to by Lauenstein at the last Congress of German Surgeons at Berlin, cases in which adhesions of the abdominal organs to the parietes or neighboring organs gave rise to occasionally very severe symptoms of intestinal obstruction, biliary colic or various gastric disturbances, which have frequently been vaguely classed among hysterical and hypochondriacal complaints. Such cases ought to be treated by exploratory incision, as quite a number of them now on record demonstrate, especially when the symptoms simulate an obstruction of the biliary ducts.

#### CHOLECYSTECTOMY.

Dr. KAMMERER showed specimens from another case, in which he had operated for impaction of gall stones in the common duct. The patient, a woman aged seventy-one, had been kindly referred to him by Dr. A. Jacobi for operation. Seventeen years ago she apparently had one attack of biliary colic, lasting a few days, but she has not been treated since. In March of this year she noticed that she was becoming jaundiced, but she had no pain in the region of the liver. Her jaundice gradually increased, severe itching set in and she ran down generally. She was, however, for her age, when admitted to the hospital a few weeks ago, in fairly good condition. She was intensely icteric, her urine saturated with bile and her stools clay-colored. Her liver was enlarged. Along its border a small, very hard mass was detected on deep palpation, corresponding to the site of the gall bladder, which was more distinct when the patient was placed on the left side. The urine, examined on several occasions, contained no albumen or casts, but was of very low specific gravity (1010). The diagnosis rested between impaction of gall stones in the common duct and a malignant tumor pressing upon the latter. Exploratory laparotomy was done by the same incision as in the preceding case. After opening the peritoneal cavity, extensive and very firm adhesions with the intestines were found, concealing the gall bladder. Their separation proved quite a difficult task. When the gall bladder was reached it was found to be very much contracted, very hard and filled with stones. Considering it a worthless organ

in that condition, it was removed after ligation of the cystic duct. In dissecting it out much difficulty was experienced in dealing with the firm adhesions, and considerable hæmorrhage occurred, which was carefully checked by ligature and tamponade. In freeing the upper surface of the gall bladder, the method advocated by Courvoisier, of incising the peritonæum over the gall bladder at a little distance from the border of the liver and then dissecting between the peritonæum and the gall bladder itself, was employed. The plan seemed to work well, for although there was abundant hæmorrhage the liver tissue was not injured. After removing the gall bladder, palpation showed that the common bile duct was entirely filled with stones. It was incised longitudinally for three-fourths of an inch and the stones were then removed by all the various methods which have been recommended. One stone, lying immediately at the mouth of the duct, and preventing the passage of the probe into the duodenum, was finally removed with forceps and sharp spoon after partly breaking it between the fingers. Then a thick probe readily passed into the bowel. The incision into the common duct, from which bile had been pouring in very considerable quantities, was closed by half a dozen silk sutures, and the field of operation surrounded by four strips of iodoform gauze, the ends of which were passed through the outer angle of the abdominal incision, which, with the exception of this portion, was closed by silkworm sutures. The operation lasted three hours, and the patient had taken eight ounces of ether by Parkinson's inhaler.

From a surgical point of view the operation was a success, but the patient unfortunately succumbed on the seventh day to chronic nephritis. Although the quantity of urine passed in twenty-four hours steadily increased to twenty ounces on the last day, and the albumen decreased very rapidly, the specific gravity remained very low, and the patient died of uræmic intoxication. The temperature had once risen to  $100.8^{\circ}$ , but it generally averaged about  $99.5^{\circ}$ ; the patient's bowels had moved from the second day on, the defecations containing a large quantity of green bile; no bile pigments were found in the urine after operation.

At the post-mortem primary union of the incision into the common duct was found; a small stone lying at the junction of the cystic and hepatic ducts had escaped detection during operation; the border of the liver had retracted to about an inch above the line of incision; there was nowhere any indication of suppuration; the wound from which the tampons had been removed on the fifth day had become

obliterated. Both kidneys were found in a state of advanced granular degeneration. The speaker desired to call attention to the advantages of the incision of Courvoisier, which he had employed in both these cases. The transverse incision, severing all the muscular layers, even the rectus abdominus, from the linea alba, seems to have decided advantages over the vertical incision in obscure cases. On several other occasions the speaker employed a vertical incision, but he had not been able to explore the lower surface of the liver as thoroughly as by the transverse incision. He had also convinced himself of the importance of Courvoisier's suggestion, to make the incision parallel, but somewhat above the border of the liver, thus enabling the operator after opening the abdominal cavity to draw the liver well upward without interference from the upper edge of the incision.

DR. JOSEPH BRYANT, in discussing Dr. Kammerer's cases, said: I will mention a case which raises the question of diagnosis rather than that of operation, as this case was not considered a proper one for such an expedient. The patient, a gentleman about forty-nine years of age, began ten years ago to have symptoms that resembled in all essential respects violent attacks of hepatic colic, due to passage of gall stones through the common duct and through the cystic duct. He had been afflicted early in life with malaria, having suffered repeated chills for a considerable time at long intervals before the beginning of the symptoms to which we are to allude. With these attacks the liver became increased in size, tender and somewhat painful, particularly well marked over the exposed portion of the left lobe. The abdominal region, corresponding to the situation of the gall bladder and pyloric extremity of the stomach, was extremely tender, and the seat of a grinding pain. In no instance but one was the attack followed by jaundice; in this one it was more prolonged than usual, owing to the inability of the gentleman to avail himself of treatment, and temporary, though not marked, jaundice appeared on the following day, and continued three or four days thereafter. The urine contained the coloring matter of bile. These attacks occurred usually in the afternoon, never in the forenoon, and rarely at night. They came on suddenly sometimes, without any premonition whatever; at others a dull, heavy feeling in the region of the liver presaged an attack. On two or three occasions chilly sensations preceded and attended the onset of an attack. These attacks were always promptly relieved by hypodermic injections of Magendie's solution of morphia, varying in amount from ten to thirty drops, the



latter amount being given in divided doses. I think it proper to say at this time that on several occasions following these attacks a close scrutiny of the dejections was made by means of a fine sieve and water, but never resulted in detection of a calculus. However, in one instance, after the free administration of large doses of sweet oil, the friends of the patient visited my office in great glee, claiming that the gall stones had been freely passed, at the same time pointing to an aggregation of small round bodies, apparently concretions, but which on examination proved to be only sweet oil arranged in a compact globular manner. This illustration, no doubt, explains the fact, in part at least, of the great reputation possessed by sweet oil for the treatment and cure of gall stones. The patient has been under my observation for more than ten years, and in no instance have remedies been found that would cause more than temporary relief of his trouble. Fortunately, however, he has but to go south, or north, at some distance from the city, and all attacks cease at once, and thus far have never returned during his absence from home. After his return the time preceding a recurrence varies from one to several months. Whether this be a case of biliary calculi pure and simple, nagging away at the cystic duct, or the passage of small ones through the common duct, or of soft ones in the liver, is a matter of conjecture alone, as it seems to me. The gall bladder itself has never presented any evidence of enlargement whatever. May it not be a case of gastro-hepatic neuralgia pure and simple, dependent upon malaria, or a form of calculus disease, the attacks of which are excited by malarious influence? At all events it has never seemed wise to me to make an explorative incision when such prompt relief followed absence from home. I have seen two other cases corresponding in all clinical respects exactly with this one.

DR. PARKER SYMS then read a paper entitled, *A Case of Cured Aneurism of the Abdominal Aorta Simulating an Abdominal Tumor*. See page 314.

## THE DIAGNOSIS OF ABDOMINAL TUMORS.

DR. F. W. MURRAY: The history of this case recalls to my mind one which was under my care last year at St. Luke's Hospital. A man, forty years of age, was admitted to the medical side of the hospital suffering from intense pain in the left side of the abdomen and inability to walk. Pain came on suddenly ten days before admis-

sion, steadily increased, and only by assuming a recumbent position with the thigh flexed was any relief obtained. He acquired syphilis eighteen years ago, and about a year ago had suffered from fecal impaction; beyond these facts his history was negative. At the request of my medical colleague I saw the patient. There was rigidity of the abdominal wall, most marked on the left side, no distention, and no signs of tumor on palpation. Rectal examination revealed a mass in the left iliac fossa. The left thigh was sharply flexed on the abdomen, and any attempt at extension caused severe pain in the left iliac and lumbar regions. Examination of spine negative. As the patient was constipated, cathartics and high enemata were recommended. Free movements of the bowel followed, but no improvement in the pain. At a second examination it was thought slight fluctuation could be felt over the left kidney. At the urgent request of the patient, who was worn out with suffering, it was decided to examine him under ether, and if necessary explore the abdominal cavity. Under ether, there was felt a tumor occupying the left iliac fossa and extending upward. It was rather firm in consistence; no fluctuation, no pulsation. On opening the abdomen the tumor was seen to be retro-peritoneal and pulsating. It was thought to be either a pulsating sarcoma of the psoas muscle, or an aneurism of the common and external iliac arteries. As it was beyond surgical relief, the abdomen was closed. The patient was entirely free from pain after operation, and did well for two days, when peritonitis set in, and death soon followed. Autopsy revealed a small sacculated aortic aneurism, near the origin of the inferior mesenteric artery, which had ruptured into the sheath of the psoas muscle, so that the entire sheath of the psoas formed an aneurismal sac. The aortic aneurism had existed for some time, as the bodies of two lumbar vertebræ were extensively eroded, and the rupture undoubtedly occurred at the moment when the sudden onset of pain set in. The case illustrates the difficulty one meets with at times in making a correct diagnosis of the nature of abdominal tumors. It is mainly for this reason, and also on account of the rare occurrence of cases of this nature, that I have related this history. Death was due to septic peritonitis owing to circumstances beyond the control of the surgeon.

DR. BRIDGON asked whether Dr. Syms' patient had syphilis?

DR. SYMS replied that he denied having had syphilis or any symptoms of it, and he could find no evidence of the disease. Presumptively, however, he had.

DR. BRIDGON then said that fifteen or twenty years ago, when consulting in a case with Dr. Willard Parker, he referred to the fact that nearly all cases of external aneurism which had come under his observation had given a syphilitic history. Dr. Parker asked him to look up the subject, and he did; and while he could not recall the precise result of that investigation, he was reminded of a fact that he had forgotten when presenting a case recently of ligation of the femoral artery for popliteal aneurism, that that was the twentieth occasion on which he had tied the femoral in Scarpa's space for popliteal aneurism, and in every one of them there was a profoundly marked syphilitic history. One case was bilateral, and the artery on both sides was tied. In this connection, he said, that in his judgment simple ligature is preferable to any other method of treating popliteal aneurism. Some of these cases had previously been treated for a considerable time by pressure; in one by Esmarch's bandage without success, whereas ligation proved successful in every case. He thought that at present he should decline to try pressure or Esmarch in the treatment of external aneurisms, but would insist on proceeding at once with ligation. He once had a case somewhat like Dr. Murray's, and could appreciate the difficulties of diagnosis which he encountered.

DR. KAMMERER remembered a case which was sent to St. Francis' Hospital last summer with the diagnosis of pyosalpinx. The patient died the next day from sudden collapse before an examination under ether was possible, and the post-mortem showed a ruptured aneurism. The speaker could not, however, agree with the position taken by Dr. Syms with regard to the exploratory incision as a substitute for a thorough examination under ether. On the contrary, he believed that one of the great advances made during the last ten or twenty years in abdominal surgery was the precision with which we were able to state the condition of affairs in the abdomen before opening the latter. The necessity for bi-manual palpation under ether had not been overcome by the great safety of abdominal incision.

DR. WYETH said: I do not know but what there is a great deal to be learned by plain and candid statements of mishaps, such as have been made by Dr. Syms and Dr. Murray. I have one in this particular line, showing how difficult it is to make a diagnosis, not only by palpation and percussion, but even after the abdomen has been opened and the parts are more closely observed. The case was

that of a woman, sent to me from a neighboring State, and thought to have had a large fibroma of the uterus. She had been irregular in her menstrual periods before and after her marriage, and for four or five months had had no menstrual flow at all. A large tumor occupied the lower portion of the abdominal cavity, with some elevation or lobular feeling on both sides. The case was a very important one to myself, and I had three skilled specialists and gynecologists see her, and all examined her to their hearts' content. I told her and her husband that I did not know what was the exact condition, but that I would make an exploratory incision, and if the operation should develop into anything extremely hazardous it would be abandoned and the wound closed. That was satisfactory to them. Two of the consultants were professors in colleges, and the third a man of large experience also, and we all thought there was a uterine fibroid. We were all in doubt about the woman's pregnancy. I made a free incision, and coming upon the uterus found that in its lower and middle portions it looked normal, while two very large tumors sprung from the cornua. I put my hand in, lifted up the entire mass, and hesitated a while whether I should go on, but as there were very extensive and strong adhesions, I concluded that hysterectomy would cost the patient's life from hæmorrhage and the length of the operation. Therefore, the wound was closed. I was satisfied the tumors in my hand were myomata, but I could not make out the condition of pregnancy, although, as I have said, the possibility of it had already been discussed. The thickness of the tumors on the uterus was so great that the presence of a fetus in utero could not be made out. The patient went home, and in two months had a dead baby, born about the eighth month. It probably had died at the time when we were trying to make the diagnosis.

DR. BRIDGES once entered the operating room of a large hospital in this city, where the surgeon, one of the most eminent in his day, was about to make the incision for removal of the uterus, the supposed seat of a tumor. A gentlemen present requested him to put a catheter into the bladder, which he did, whereupon the tumor disappeared. It had been the distended bladder.

DR. SYMS: Notwithstanding what Dr. Kammerer has said regarding the probability of making a diagnosis before opening the abdomen, I would like still further to emphasize the position taken in the paper. I do not only from my own experience, from a number of mistakes in diagnosis which I freely confess to having made, but (and I say it

without intending any disrespect) from the mistakes I have witnessed on the part of others, men of great eminence and ability, I think it is a very wise rule to always consider laparotomy an exploratory operation and let the steps be decided upon according to the conditions found. I recall an occasion when a gentleman was making three laparotomies and a spectator asked him whether he did not find it difficult to make the diagnosis before opening the abdomen? He replied that he never made a mistake. In all three of those cases, however, he had made a serious error in diagnosis.

#### INTESTINAL OBSTRUCTION; LAPAROTOMY; DEATH.

DR. C. K. BRIDGON presented a specimen with the following history: W. M., aged twenty-five years, was admitted to the Presbyterian Hospital, December 18, 1892. Four days before admission he felt nauseated when returning from work, and went to bed on reaching home; he vomited several times, at first the ingesta, and then a greenish fluid; he suffered much from thirst and was feverish; a physician was summoned, who advised his removal to a hospital, but he refused. The next day an enema was given that simply emptied the contents of the rectum; on the following day two drops of croton oil were given without results; on the fourth day his condition was worse; pain continuous with frequent exacerbations, constipation absolute, and vomiting at short intervals. These facts were elicited from his friends the day after his death.

When he entered the hospital his condition was obscure; no one came with him but his mother, and she disappeared as soon as he was placed in the ward; he appeared to be in a dazed, apathetic condition; denied vomiting and pain, asserted that he had had a faecal movement and that flatus passed occasionally; his tongue was dry, his abdomen moderately tense; no protrusion from any of the hernial apertures, nothing to be felt per rectum; temperature normal; pulse, 110; respiration, 20. He was ordered an enema in the inverted position, under the influence of chloroform; during the next twelve hours the vomiting was ascertained to be faecal, and at 2.30 on the 19th he was placed under the influence of chloroform and an incision was made six inches long along the outer border of the right rectus muscle. On opening the cavity of the peritonæum a portion of dilated small intestine presented in the wound, the cæcum was found contracted and empty; after a few moments' search the patient's exhausted con-

dition indicating a rapid conclusion of the operation, the dilated intestine was brought through the opening in the abdominal wall, surrounded with hot compresses and a longitudinal opening an inch long was made in its free border; this permitted the escape of a large amount of liquid fæces and gas, and when the discharge ceased the edges of the opening in the intestine were sutured to the abdominal wall, which was also closed, and supported with a loose absorbent dressing. He recovered fairly well from the anæsthetic, but was very restless, and died eight hours after the operation.

It was not possible to obtain consent of friends for an autopsy, and examination could only be made through operation wound. Pathologist's report as follows: Wound opened after death and found a Meckel's diverticulum four inches in length; this and the intestine above were much distended: the intestine below was empty and contracted; just below the diverticulum the intestine was very narrow and not dilatable with moderate force, and here also the mesentery was very short. It seemed that the short mesentery might have caused a kink which, aided by the constriction, was sufficient to produce the fatal obstruction.

DR. BRYANT once had an unsuccessful case of intestinal obstruction, caused by Meckel's diverticulum, which arose about 18 or 20 inches from the ileo-cæcal valve, and was attached by means of a fibrous cord to the mesentery. The open portion of the diverticulum was about 6 inches in length, the fibrous portion was about 4 inches in length. In this instance the patient was sixty-eight years of age, was attacked suddenly, attended with great pain, and seen in consultation forty-eight hours after the attack, while moribund. Laparotomy was performed upon the insistence of the friends, which resulted in finding several inches of completely gangrenous intestine, and the abdomen containing an abundance of bloody offensive fluid. The patient survived the operation about twelve hours.

DR. KAMMERER had lately operated on a man who had suffered from fecal abscess of obscure origin, which had been subjected to surgical treatment by incision, curettement, etc., on several occasions, but had never shown any tendency to heal. Laparotomy had, therefore, been done, and a Meckel's diverticulum, about 1 inch in length and attached to the umbilicus, had been found as the cause of the intestinal strangulation; this had in turn led to the formation of an intra-abdominal fecal abscess. He had been obliged to establish an artificial anus, owing to the complicated conditions found about the strangulated sigmoid flexure.

## EDITORIAL ARTICLES.

### THE EVOLUTION OF THE AMERICAN SURGEON.<sup>1</sup>

THE Columbian year has just expired. The pomp and glitter of processions, and the rhetoric of eloquent oratory, the marshalling of historical items from the annals of the past, the resources of imagination, the fruit of the printer's type, the painter's brush, the sculptor's chisel and the architect's pencil have all been combined in celebrating the faith and courage and persistence of the Discoverer, and the wonderful material progress of the Discovered. For the time being we have been making of chief interest in our thought the times in which the Discoverer lived, the place that gave him birth, the conditions that molded him in his development, the influences that drove him on in his purpose, and sustained him during the many days of his daring advance across the unknown waters toward the land of his dreams. It is but natural, therefore, that an assembly of medical men, sharing in the general epidemic influence, should turn with special interest to the condition of their own profession at this particular period of the world's history, and should with interest, and mayhap with profit, trace the changes which have marked the development of the medical world during the four centuries that have since elapsed. To a more restricted field still would I invite attention during the present hour, and ask attention first to the surgeons and surgery of the Columbian era, this being more especially for the purpose of giving me a fitting background for the picture of the American surgeon of 1893, which it is my desire to present to you, in the course of an effort to discharge the duty which the accident of my position for the present hour has laid upon me.

More than a hundred years have elapsed since Saint Louis, the

<sup>1</sup> The Anniversary Address delivered at the Eighty-seventh Annual Meeting of the Medical Society of the State of New York, February 8, 1893, by its President, Lewis S. Pilcher.

truest and last of the Crusaders, had expired among the sands of Africa, and the last Crusade had burnt itself out. Men have ceased to care that the holy places are in the possession of the infidel. It is an age of religious apathy but of intense interest in classical learning and artistic effort. No longer are men divisible simply into three classes of masters, dependents and clerics. The crust of the feudal system which had enthralled the nations of Europe has been broken up and a new social order has emerged from its ruins; commerce has been created, art again has begun to charm men, while literature and philosophy command the devotion of multitudes. Most important result of all has been the rise of the middle class, the true safeguard of nations, the repository of faith and patriotism, the source of progress, the conservator and producer of wealth, the mother of merchants, navigators, architects, artists and scholars—a class which is ever the true index of a nation's greatness. The character and attainments of the physicians of an age or nation in a particular degree is always an exponent of the average character and attainments of this class, plus the added refinement and elevation of character which the pursuit of medical study and practice inevitably attaches to its devotee. The civilization of Greece, which produced Pericles, Socrates and Plato, added additional lustre to its record by the birth and teaching of Hippocrates. The Golden Age of Rome, when, if we can trust the judgment of Gibbon, the human race was most happy and prosperous, and when the vast extent of the Roman Empire was governed by absolute power, under the guidance of virtue and wisdom, is no more celebrated for the production of a Marcus Aurelius than for the life and work of the man whose teachings were to determine medical thought for 1400 years, Claudius Galen. The enlightened and liberal reigns of the Bagdad caliphs, when all Europe was obscured by the ignorance of the dark ages, preserved to the world learning and philosophy, and created Rhazes and Avicenna; while in the west, the civilization which culminated in the Alhambra was adorned by the work of Avenzoar and Averrhoes. Time fails to permit me to give in detail the evidences of this close relation between general



intelligence and medical progress which crowd upon the notice of the student of history. It is no less true in the present age than in the distant past. The quickening thought, the broken barriers, the elevation of the common people that followed the French Revolution made the French medical profession of fifty years ago to lead the world, resplendent as it was with the names of Larrey, Dupuytren, Laennec, Louis and Velpeau, and a host of others. The hundred years of growth among the common people of England that followed the Cromwellian period, despite the mediocrity of the princes that nominally ruled the country, created the conditions that made possible and called forth the Scotch cabinet maker's apprentice, John Hunter, the London merchant's son, John Abernethy, and the Norfolkshire clergyman's son, Astley Cooper. While the Victorian era, with its material splendor, its heaping up of wealth, its advancement in literature, science and art unparalleled, its glorification of the common people, has given us out of the bosom of this people a Simpson, a Paget and a Lister. And Germany, rising from its abasement of 1807, by its educational and civil reforms has created a new people, whose power and attainments are fitly typified, not alone by a Bismarck or an Emperor William, but quite as much by the names of Virchow, Langenbeck and Koch. In a word, the medical profession is peculiarly "of the people and for the people." Medical men come nearer to the heart of the people than do men of any other calling. What shall be the standard of their attainments and their training is a matter that is largely self-regulating, especially among an intelligent people, in accordance with the great principles of demand and supply.

Three hundred years before the Columbian period which now engages our attention, the accomplished and enlightened emperor, Frederick II, had attempted to regulate the medical profession in his kingdom of Naples and Sicily, and had made an ordinance in these words: "Since no progress can be made in medicine without a knowledge of logic, we will and ordain that no person shall be admitted to the study of this art unless he has given himself at least three years

to logic. Afterward he shall devote five consecutive years to medicine, and at the same time to surgery, which forms a part of medicine. 'Then only and never before this time shall he be admitted to examination and receive permission to practice.' Still further, he ordained that the first year of the neophyte's practice should be done under the eyes of an old and experienced physician. Wise ruler! No better regulations could be devised by the most enlightened legislators of the close of the nineteenth century! But Frederick was 300 years ahead of his time. He was doubtless acting under the counsel of the teachers of the School of Salernum, which school was then at the height of its renown, while southern Italy was all aflame with the new life which the times of the Crusades had awakened.

With the lapse of the conditions that awakened this temporary brightening up of scholarly life in southern Italy the life itself languished, the school of Salernum fell into decay, the influence of the average attainments of the people reasserted itself. Pope Innocent III, in 1215, promulgated his bull that as the Church abhorred all cruel or sanguinary practices, not only should no priest be permitted to follow surgery, or to perform any operations in which instruments of steel or fire were employed, but also that they should refuse their benediction to all those who professed and pursued it. No wonder that 200 years later, in the beginning of the Columbian century, according to the statement of Malgaigne, the surgeons of Italy were in general timid practitioners, who scarcely dared to handle a knife: all their resources consisting in multiple recipes, of many of which they made a secret. Professors of medicine in that age were, for the most part, only commentators, taking up some author of whom they could read at first the text, then illustrating this text by their comments. Thus their lessons were true "readings," and the professors properly bore the name of "*lecteurs*"—readers.

Beginning with the end of the fourteenth century the two authors most in vogue for the complete courses of internal pathology were Avicenna, for general affections or fevers, and Rhazes' ninth book, for local maladies. And as this ninth book took up all diseases in the

order of regions from head to foot, the commentator had necessarily to pass in review the affections of the ears, the eyes, the mouth, the intestines, the genito-urinary organs, in a word, all surgical affections proceeding from internal causes. Mechanical lesions alone remained out of the category. Operations for stone in the bladder were still abhorred by respectable surgeons and relegated to itinerant specialists, who were the "official surgeons" of that day. The first of the Colots, Germain, had, however, already risen superior to this prejudice, and in France had established the operation of lithotomy by the "apparatus minor," as a legitimate surgical procedure, while the use of the apparatus major had not yet, perhaps, suggested itself to the young surgeon of Cremona, Joannes de Romanis, who thirty years later was to communicate the method to Marianus, through whom the Marian operation was to become introduced to the world.

The Columbian period is not distinguished by any pre-eminent name in surgery, nor by any epoch-making discovery. The changes in the social state, the fermentations in the intellectual vat of the time had not yet reached the point where their full effects were to be realized in the field of endeavor. It contains much of interest, however, to the student of the evolution of surgery in the indications which are already discernible of the brilliant achievements of the succeeding century. The Italian universities of Bologna, of Padua, of Pisa, of Ferrara are being crowded with students from all parts of Europe. During the first quarter of the century Peter of Argelata has been teaching surgery at Bologna and writing his work on surgery. No vulgar or timid salve-monger was Peter. He taught philosophy and medicine as well as surgery. As an operator he trephined the cranium, he bored the tibia for the relief of osteo-myelitis, a sequestrum within the femur did not daunt him, he drew back only from caries of the hip and of the vertebræ. He operated for hernia and for stone, he embalmed the body of a pope with his own hands, he did not hesitate to dilate the uterine cervix and to carry his hand into the cavity of the organ and with hooks and forceps to bring out therefrom a retained fœtus, and when he died his admiring contem-

poraries erected to his honor a statue in the amphitheatre of the university to whose fame he had contributed so much. In 1480 his book, *De Chirurgia Libri Sex*, was first put into print at Venice; a second edition appeared in 1492, and a third and a fourth rapidly followed each other before the close of the century. Two more editions were called for in the early part of the sixteenth century. In this book the author, though he has borrowed much from Guy de Chauliac and from Avicenna, has gathered many noteworthy observations of his own. He protests against the abuse of sutures, exploits the value of compression in the treatment of old ulcers, and makes a note that a part may lose the power of muscular motion without the loss of sensation. This book of Argelata was the *vade mecum* of the better class of Italian surgeons of the close of the fifteenth century. To one copy of it attaches an interesting history. More than 200 years after the death of the author, an assistant surgeon at a Florentine hospital, while rummaging among musty archives for another purpose, came accidentally upon a copy of the *De Chirurgia Libri Sex* of Argelata. The broad margins of its folio pages he noticed were covered with copious notes. His curiosity was stimulated to decipher them, and thus was brought to light the "One Hundred Observations" of Marcellus Cumanus, which a few years later, in 1667, were published by Welsch, among his "Six Hundred Medical Observations" (*Sylloge Curationum et Observationum Medicinalium, Centurie Sex*). Marcellus Cumanus was a Venetian surgeon, of whose birth or death, or family or personality, nothing is known. We simply know that in 1495 he was serving as a surgeon in the Venetian army during the invasion of Charles VIII; that he was a man who had both the mind to observe and the talent to record what he saw even among the distractions of wars and camps. These observations, written down upon the margins of his surgical text-book, still remain to rescue his name from oblivion, and to testify to us in these days of the calibre and quality of an every-day surgeon in Venice four hundred years ago. One cannot help but wish to know more of him, of his family, his education, his social position, his business success. His

notes show that he did not venture far out of the track marked out by his master, though he was already compelled to strive with two important elements of military surgery that were unknown to Argelata, viz., gunshot wounds and syphilis.

When Argelata laid down his work, Leonard Bertapaglia took it up and continued it at Padua and at Venice until his death, in 1460, but in a manner that commands our respect far less than that of his predecessor. Operative surgery he abandoned to bathers and barbers. He shared in the astrological superstitions of the day. He evidently understood human nature, and had the faculty of recommending himself to the rich and powerful, for it is recorded that he enjoyed a great reputation at Padua and afterward at Venice, and that he amassed such a fortune that he was able to amuse himself in his later years with the erection of magnificent buildings at Padua and its environs, an amusement which some of us can testify is not altogether inexpensive even in these later times. The best thing I have been able to discover about Bertapaglia is that he himself dissected two human cadavers, and thus helped to create that public sentiment which enabled the famous anatomists of the next century, Eustachius, Realdus Columbus, Gabriel Fallopius, Hieronymus Fabricius and Vesalius to inaugurate their systematic and continued dissections of the human body. These were the times of seed sowing and preparation. When Columbus sailed from Palos, in 1492, Guinterius, the future teacher of Vesalius, was a boy of five years playing in the streets of Andernach; Paracelsus, the iconoclast of traditional medicine, was a baby in his mother's arms, and the apothecary of Cremona, whose son, Realdus Columbus, was to become the first discoverer of the pulmonary circulation, had yet two years in which to amass the money to buy that son's cradle before it should be needed. The picture which Sprengel draws of the surgery of the fifteenth century is a very depressing one. It is evident that Bertapaglia, far better than Argelata, represented the spirit of his time in the position that he took in disclaiming to occupy himself with operative surgery, and in abandoning manual interference to ignorant

bathers and barbers, who could neither read nor write. Even in the latter part of the fifteenth century, the period in which we are now most interested, educated and skillful surgeons were so rare that when Matthias Corvinus, king of Hungary, wished to be recovered of a wound that he had received in battle, he was forced to send proclamations into distant countries, promising honors and riches to whosoever should succeed in curing him. At last an Alsatian surgeon, Hans of Dockenbourg, undertook the task, cured the king, and returned to his home loaded with presents.

Paris and Italy were the chief centres of learning, and inevitably within the bounds of the enlightenment that extended from their universities were to be found the highest types of both medical and surgical effort. Though the revival of Greek learning and the pursuit of philosophy on classical lines had already contributed much to change the face of science, and though at the centres of this cult great advances had been made, nevertheless the most part of the physicians of the fifteenth century remained, like those of the preceding age, superstitious adorers of Arab idols, blind imitators of their predecessors and ignorant empirics (Sprengel II. 469). Up to the middle of the fifteenth century the only practitioners of the healing art in most of the cities of Germany were the bathers, who occupied so low a position in the social scale that no artisan would accept the son of one of them as an apprentice. As yet without universities, as a nation poor, the German barbers, unable to buy books, without any systematic instruction attainable, dependent upon the system of apprenticeship for education, did not extend their ambitions beyond what they had seen their masters do. In the free city of Strasburg did the first tendencies to betterment show themselves. It was from here that Hans of Dockenbourg went to cure the Hungarian king, and it was here that Jerome of Brunswick was practicing and writing his *Buch der Chirurgia und Wirkung der Wundartzney*, while Columbus was plowing his way westward over the Atlantic. English surgery was yet to be created. From the time of John Ardern, who lived during the last half of the fourteenth century,

when he wrote his treatise on "Fistula in the Fundament," to that of Thomas Vicary, who lived in the middle of the sixteenth century, there is not a single English surgeon whose work is of importance enough to find a place in the annals of surgery. There is one British name, however, that is intimately associated with the learning that characterized the best of the Italian surgeons of the Columbian period, who doubtless came in contact with them as a fellow-student at the court of the magnificent Lorenzo de Medicis, and who in turn may have exerted some influence on them. I mean that Derbyshire gentleman, Oxford fellow, polite scholar, and elegant classicist, Thomas Linacre, who about 1484 went to Italy and spent some years at Bologna, Florence and Rome pursuing studies in classical learning, natural philosophy and medicine, and who in the courts of Italian princes perfected himself in those graces which later made him the medical arbiter to three successive English kings, and enabled him, by the institution of the Royal College of Physicians in London, to lay the permanent foundations of rational medicine in Great Britain.

The state of surgical affairs in Paris at the close of the fifteenth century is both interesting and instructive. For more than 200 years the surgeons of the College of Saint Come had been attempting to regulate the practice of surgery in that city and district through the privileges originally granted to the organization by Saint Louis at the instance of Pitard and Lanfranc. The College of Saint Come was a society of surgeons, self perpetuating, into whose membership were to be admitted only surgeons of recognized orthodoxy, both in theory and practice, while they were clothed with the power to forbid the practice of surgery to all who should fail to obtain their approval. As time passed the college had increased in importance and influence; its members wore long robes, delivered lectures, granted certain degrees, and modeled themselves after the faculty of medicine, though imperfectly. The number of its members was always small, from nine to fifteen, usually. But the prevailing prejudice of the time, that regarded all manual effort as degrading, had not been without its influence on these surgical aristocrats. The more highly they esteemed

themselves the more they disdained surgical handicraft, until they came to regard it as beneath their dignity to reduce a dislocation or dress a fracture : minor operations were relegated to the barbers, and many major ones, as those for stone, hernia and cataract, were abandoned to specialists called ‘*inciseurs*,’ and in the restricted territory that was left they busied themselves simply with the prescription of topical applications and internal remedies. More and more ordinary surgery in Paris fell into the hands of the barbers. Profoundly self-satisfied, content with the teachings of Guy de Chauliac, Lanfranc, and others of the Arabists, intent on preserving their prerogatives from the encroachments of the aggressive barbers about them, no scientific progress was made by the surgeons of the long robe during all the generations that had elapsed since their organization : no great name graces their annals. During this very last decade of the fifteenth century all their energies were being devoted to prevent barbers from being admitted to courses in anatomy and surgery in the vulgar tongue, that the faculty of medicine were proposing to open for their instruction, an effort which was successful for a time only, since in 1499 these courses were finally organized, resulting in the formation within a few years of a new corporation known as ‘*barber-surgeons*,’ in the steady decadence of the influence of the College of Saint Come, and, in the course of the next generation, in the development, from among the barber-surgeons, of that prince among surgeons, the real founder of rational surgery in France, whose influence has been felt in all countries and in every generation since, Ambroise Paré.

The members of the College of Saint Come confined their work entirely to Paris, where only were to be found those social surroundings and financial rewards that were befitting their aristocratic aspirations. In the provincial cities and throughout the country the barbers and ‘*inciseurs*’ had undisputed possession of the surgical field. That the class of work which they did must often have been fair, and that the training to which many of them were submitted was of considerable merit considering the age and time, the statutes of the city of Bordeaux for 1457 inform us, according to which we learn that a



candidate for admission to the guild of barbers in that city had to appear before four examiners, in the shop of each of whom he had to spend eight days, during which he had to demonstrate his skill as a barber, while the examiners were to assure themselves that he had good sight and a good and true hand for shaving and bleeding; that he knew how to make lancets sharp and pointed; that he knew the veins from which blood could be taken; and how to do other things belonging to the trade of barbery and surgery. Especially in the matter of surgery the examiners were to assure themselves that the candidate was learned and expert in the anatomy of the human body, in abscesses, fractures, lacerations, wounds, dislocations, chancres, fistulas, and generally in all other maladies that can befall the human body, and in all other things necessary and belonging to the office and trade of surgery; likewise, that he knew how to stitch, bind up and suture a wound, and was acquainted with the herbs and other things required for making ointments and plasters. In a word, they were to examine him upon everything else which seemed to them proper and reasonable for the good and profit of the public and for the honor of the aforesaid trade. This examination was a public one, in the presence of the mayor and other officers of the city. The candidate, once accepted, was to swear to exercise his functions well, and to obey the laws, to lead an honest life, to keep good ointments in his shop, and not to exact excessive fees, and to keep the secrets of his clients.

We turn with a sense of relief from the picture of narrow selfishness and pretentious assertion that is preserved for us in the records of the Parisian surgeons of the long robe, to make brief mention of three additional characters of a nobler type from among the Italian surgeons of this period, with the mention of whom must close this glance which we have attempted at the surgeons of the Columbian period; and first I must mention one in whom culminated the surgery of the Middle Ages, and whose writings for fifty years, far toward the close of the succeeding century, dominated surgical thought and practice in Europe, until they were swept aside by the masterful

originality of Paré, whose acquaintance with Arabians and Arabists, with Hippocrates, Galen and Celsus, with Aristotle, Cicero, Ovid and Suetonius, as evidenced in his writings, testifies to his erudition and scholarship, and who was withal a fortunate and skillful practitioner as well as an erudite scholar, Jean de Vigo, who in 1492 was a young surgeon of thirty-two years of age, at Genoa, but who later attracted the attention and secured the confidence of Pope Julius II. who called him to Rome, where he composed his *Practica in Arte Chirurgica Copiosa*, a book which had prodigious success, going through twenty-one editions in less than thirty years, a book which, despite its merits as a summary of the surgical knowledge of the day, leaned too much to the pharmaceutical rather than to operative surgery, and tended to retard true surgical progress.

The rival and opposite of Vigo was Jacopo Berengario Da Carpi, the boldest surgeon of his time because the most skillful in anatomy. He himself claimed to have dissected several hundreds of cadavers, and was commonly believed to have also dissected living men that he might study the beatings of their hearts. He was ten years younger than Vigo, having been born in 1470. He was the son of a surgeon of Carpi named Faustino, was a schoolfellow with the young Duke of Carpi, was a pupil of Aldus Manutius, and later a friend of Benvenuto Cellini, with whose fiery temper he evidently had much in common. He was both a doctor of philosophy and of medicine, and was professor of Surgery at Bologna, and later went to Rome, where he enjoyed great fame and accumulated much wealth. He was proud and bold enough to refuse the request of the Pope himself that he should enter his service, disdainfully saying that he preferred to be at the service of every one who should seek him. At his death he left behind him the great fortune of 40,000 crowns.

The last name that I shall mention is that of a Florentine physician, Antoine Benivieni, whose period of active practice extended from 1470 till his death in 1502. He was of noble family, and was an active participant in the mental activities and splendors of Florentine life during the most brilliant period of the Medicis. He enjoyed

the friendship and instruction of Poliziano and Ficino, whose counsels he shared with the young English medical student, Linacre. He cultivated belles-lettres, philosophy and Greek, as well as the technical studies of his chosen profession. In his work he embraced the entire art of healing, but devoted himself more to surgery than was usual to the physicians of his time. Before his death he had collected into a manuscript volume a large number of personal clinical observations; these were printed after his death under the title of *De Abditis Morborum Causis*. All of which show him to have been a profound observer and a skillful surgeon. He enjoys the singular honor of having been the first to habitually seek for the *hidden causes of disease* by examination of the body after death. He was not content to perform autopsies upon the bodies of his own patients only, but he sought with ardor for every opportunity for such examinations.

\* These three names, all contemporaries of the Columbian era, fitly round out the picture of the surgery of that era, when the door of the Middle Ages was closing, and the signs of the oncoming of the achievements of modern times were beginning to appear. Vigo represents all that was good of the past, with its prejudices and its limitations; Carpi, fearless and skillful as anatomist and operator, had in himself all the force and the potentialities of the surgery of the present day; Benivieni is a type of the clinical observer and the pathological investigator, those elements of modern scientific progress to which most of the vaunted achievements of the present day are due.

In the references to the surgeons of the Columbian period which I have made, it has not been my plan to speak in any detail of the particular procedures and methods which they adopted; it has not been so much the state of the theory and practice of surgery that has engaged my attention as it has been the character and training and social status of the practitioners themselves. It was still a rude age; the enlightenment that had dawned upon Europe was still in its early morning, and the chains of tradition and of ignorance still held the

masses; the houses even of the great harbored filth and dirt; the bottom layer of the rushes that covered the clay floors of the dwellings of the people was left undisturbed for years; the principles of hygiene were unknown; the labors of the people were hard and illy rewarded; the disturbances of war were incessant; and yet, in their way, the men of the fifteenth century doubtless enjoyed life, and barring the effects of pestilence and the sword they lived out the measure of their years as men do now. Their physical wants were crude, their ideas of the necessity of medical treatment and surgical relief were doubtless as fully met by the practitioners of that day as are those of the people who call upon us in this day and generation. And we have seen that in that age, as in this, every grade and quality of person was to be found in the ranks of those who professed to heal disease. The disdain which was then general for anything which savored of manual labor tended to relegate the operative and technical side of surgery to an inferior place in the healing art, and correspondingly to elevate in the estimation of men those who only theorized and prescribed. Much of superstition still clung about every branch of medicine. The efficiency of a prayer said during the compounding of an ointment; the favorable conjunction of the planets for the undertaking of an operation; these were matters of importance to the best of the surgeons of this age.

Nevertheless, as we have seen, there were never wanting men of originality and power, who rose superior to prejudice and superstition and shed lustre on the surgical art. Such were men of liberal education who were versed in medicine as well as in surgery, of good social position, even sometimes of noble birth; they sat at the feet of philosophers and shared in the conversation of poets and artists; they were the friends and companions of cardinals, princes and kings; they were the favorites of popes, and often were loaded with honor and wealth.

The careers of these fifteenth century surgeons abundantly illustrate the same truth which those of the nineteenth century are proving to be no less true now than then, viz., that in the paths of surgical

effort the enduring rewards of public confidence, of honor and emolument are the most certain to be secured by those who, to natural mental gifts, chastened and enlarged by liberal and broad training, shall add enthusiasm and application, coupled with an ability to rise superior to the obstacles of prejudice, tradition and conventionalism.

My theme is "The Evolution of the American Surgeon." What has preceded may be considered as the prologue to this theme. The worthies of the fifteenth century have faded from our vision, and in their places rise Warren and Bigelow, Mott, Parker, Wood, Hamilton, Sands and Sims, Physick, McClellan, Pancoast, Gross and Agnew, Brainard, Gunn and Parkes, McDowell and Dudley and a host of others who within the last hundred years upon this new continent by their lives and their works have contributed to the development of a type of work and of workers in surgery which may properly be called a distinct school, that of American surgeons.

The absence of a hereditary superior class, the necessity of building from the foundation in the whole social as well as political fabric, the atmosphere of freedom, the prevalence of intelligence and education, the restless ambition and strife for advancement, the discontent with humble things and the possibility of betterment open to all, the mingling of races and of ideas, the sense of personal worth, the contempt of tradition and of conventionalities, the self-reliance, the adaptability to circumstances, and the ability to shape circumstances to conform to wishes, the stimulating climate, the fertile and responsive soil, the rich rewards to be secured by labor in every department of human effort, the prevailing religious tone, the regard for learning, the pride of citizenship and of sovereignty—these, among other influences, have contributed largely to the development, in the course of time, of a special type of manhood in the New World that waited for its discoverer 400 years ago. Among such a people, if there is any truth in the close relation of the character of the medical advisers of a people to that of the people themselves—which was maintained in the earlier part of this address—it is inevitable that a new type of physician should arise. Here all shades of medical thought and pre-

tence have had an equal arena. No vagary so wild, no pretention so preposterous, but that it has been here afforded a hearing, and the principle that every individual shall be free to choose his own medicine as well as his own religion, has been permitted its full sway. That governmental paternalism which says to the people: "Since you are not in the natural order of things capable of judging in these technical and recondite matters, you shall be saved the trouble of making such choice, and only those shall be permitted to minister to you whom the officers of the government have tested and determined to be qualified," however wise and desirable such paternal oversight might be, has had but little acceptance among this people. Whatever of medical advance and medical equipment has occurred among them has been of spontaneous development. A greater proportionate number of individuals have devoted themselves to the art of healing among this people than among those of any other nation; for two reasons, the social position of such practitioner has always been honorable, and a fairly adequate pecuniary reward has always waited on good judgment, industry and perseverance. Is it not a noteworthy fact, as indicative of the sterling good sense of this people as a whole, that among them, with the growth of years, a continually increasing influence has been accorded to rational medicine, and that the standard of attainments, both in general culture and technical knowledge that is required by the public opinion of its practitioners, has steadily advanced? The composite photograph of the medical man of the New World at the present day, if critically scanned, will reveal a man who to general culture and technical knowledge adds self-respect and self-reliance, together with fertility of resource and adaptability to circumstances, practicality of thought, the ability to see the special needs of the case in hand without regard to theories, and to apply the remedy needed; and beyond these, a catholicity of mind that lays all nations under tribute, and appropriates for his arsenal weapons forged in the fires of many lands.

It was to such a man as this, a typical American, who to the opportunities and influences of his Virginia boyhood and Kentucky

youth had added the stimulus and culture of the most famous of European schools and the ripening power of fourteen years of general practice among the pioneers of the West, to whom, in the month of December, eighty-three years ago, came riding from sixty miles distant, Mary Crawford, supporting her projecting abdomen upon the pommel of her saddle, begging relief from the ovarian tumor that was sapping her life. In all the history of surgery there was no precedent to warrant an attempt at interference in any such case. Possibly in the oratorical flights of his former Edinburgh preceptor the possibility of successfully interfering for the relief of such a condition may have been hinted at, but no one as yet had had the courage, the lofty enthusiasm, the wisdom, to make the attempt. But this woman did not make her appeal in vain. She was ready to endure; the surgeon did not hesitate to venture; guided by correct pathology and possessed of trained operative skill, he performed his part; the tumor was removed; the patient restored to health. "ovariotomy" was given to the world, and the name of McDowell immortalized. That day, in the modest dwelling of the Danville surgeon, was born into the world "intra-peritoneal surgery," a field of surgical effort whose vast possibilities for good are only now beginning to be realized by mankind.

In 1839 Velpeau in Paris wrote: "To avoid pain in surgical operations is a chimera which it is not allowable to pursue at the present day." In October, 1846, in London, Sir Benjamin Brodie said: "All physicians and surgeons have been looking in vain from the days of Hippocrates down to the present time for the means of allaying or preventing bodily pain." Within twenty-four hours of the utterance of these words, in the operating theatre of the Massachusetts General Hospital in the United States of America, an American dentist, before a host of skeptical witnesses, had demonstrated beyond cavil that the inhalation of ether would induce such a state of insensibility that under its influence prolonged surgical operations could be done without pain or consciousness on the part of the patient. A new fact, to name which a new word had to be coined, was demon-

strated to the world, a word which is now so common that it is difficult to believe that less than fifty years ago the word "anæsthesia" was unknown. With what national pride, as well as profound thankfulness to God, will American surgeons always hereafter read on the marble shaft in Mount Auburn Cemetery, which preserves the name of this benefactor to mankind, this inscription: "W. T. G. Morton, Inventor and Revealer of Anæsthetic Inhalation. Before Whom in all Time Surgery was Agony. By Whom Pain in Surgery was Averted and Annulled. Since Whom Science has Control of Pain."

The present century has witnessed the addition to surgical possibilities of three facts, which in the range of their importance as to both their direct and remote results are of supreme moment in surgery: these in the order of their appearance have been: The opening of the peritoneal cavity to operative interference, the discovery of surgical anæsthesia, and the demonstration of the relation of micro-organisms to disturbances of the healing of wounds. All these are the direct fruit of the practical tendency of the Anglo-Saxon mind, and two out of these are, without any demurring, universally acknowledged to be the fruit of the American spirit.

To these two pre-eminent contributions it would be possible to add a list, of an importance only secondary to them, which if given in detail would too greatly extend the limits of this address. I can but suggest a few of them in further illustration of the claim that I have made for a special character attaching to the tendencies due to the spirit and environment present in this western continent. The name of Motl was made famous by his ligation of the innominate artery in 1818, but to it could be added the names of many other American surgeons, who both before and after that date displayed anatomical knowledge and operative dexterity in ligating important blood-vessels during the period when such operations were considered as among the most important essays of surgical skill.

The demonstration of the principle that in dislocations of the hip and shoulder, the chief obstacles to reduction are tense ligamentous fibres, untorn portions of the capsule, which may readily be



relaxed by proper manipulations, a truth which has revolutionized the surgery of dislocations, is due to the perspicacity and labors of our countrymen—Smith, Reid, Gunn and Bigelow.

What surgeon at this day would be willing, in the treatment of fractures of the femur, to dispense with the simple method of extension by a weight and pulley, the weight exerting traction upon the leg through properly applied strips of adhesive plaster? a method which dates back only to 1851, and is due to the practical common sense of Buck, of New York City.

In orthopædic surgery the devising of apparatus whereby sufferers from tuberculous inflammation of joints might secure necessary fixation and extension, and yet not be deprived of the benefits of fresh air and exercise, has brought special lustre to American surgery, a field of work in which the names of Davis, Sayre, Taylor and Shaffer are especially to be noted as leaders. Especially brilliant in this field of effort was the application by Sayre of the gypsum bandage to the treatment of vertebral caries.

In the department of genito-urinary surgery, the key to the most important advances in the surgery of the urethra and bladder was furnished by Otis, of New York, when he demonstrated that the urethra, after incision of the meatus externus, could be normally distended to a much greater extent than had hitherto been supposed practicable, and that by full distension with linear incision of contracted areas, permanent and radical cure of strictures was possible. After the recognition of the capabilities of the urethra to receive instruments of larger calibre, came naturally the proposition of Bigelow for immediate and full removal of crushed stone at a single sitting, a proposition made practicable by the invention of instruments for litholapaxy, which attest the fertility of resource of that surgeon and the skill of his instrument makers. The urethroscope and cystoscope present themselves as later corollaries to Otis' primary work.

In the domain of gynæcological surgery, the work of Marion Sims at once comes to mind—his enthusiasm, his pertinacity, his

skill and ingenuity, as he step by step evolved his operation for the cure of vesico-vaginal fistula, discovered the best means of exposing the interior of the vagina to inspection, came to adopt silver wire as a material for sutures, and finally established that woman's hospital in New York City which, for a third of a century, has been a centre of original work and teaching in its special field. It is here that the wisdom of Emmett has discerned the true relation of lacerations of the cervix uteri to the etiology of a large proportion of woman's special ills, and has pointed out the path of relief, a contribution to woman's welfare the importance of which will certainly become more widely and unreservedly acknowledged with the lapse of time.

In the surgery of the abdomen, the introduction into successful practice of the rational treatment of penetrating gunshot wounds of the abdomen by systematic exploration of the cavity, and careful suturing of perforated intestines, will always be associated with the names of Bull and Parkes; the brilliant possibilities of intestinal anastomosis testify to the acumen and skill of Senn and Abbe and many others of our countrymen; but of the most far-reaching importance have been the contributions to knowledge of the pathology, symptomatology and treatment of inflammatory affections of the vermiform appendix, which has been a distinct contribution of American surgery, and in the evolution of which the surgeons of New York City have especially led, the names of Sands and McBurney, Weir and Bull, Stimson and Fowler, leading in the long list of the many who have contributed to its present state of perfection.

Not the least in importance among the examples of the fruit of the peculiar practical character of the American mind when turned to surgical problems, and by no means to be omitted from even so incomplete an enumeration as this, is the elaboration and perfection of the operation of intubation for the relief of laryngeal stenosis, an operation which admirably supplements tracheotomy, which is accepted in a much larger proportion of cases than the latter, and has already been the means, in the hands of American surgeons, of saving thousands of lives. To a New York surgeon, again,

O'Dwyer, is due the credit of the conception and entire elaboration of this operation.

It is with reluctance that I turn from further chronicling the achievements of American surgeons. With the increase of population, of the conditions that produce the demands for surgical acumen and skill, with the multiplication of hospitals, schools and publications, there has been a corresponding increase in every quarter of this land of active, alert, learned, skilled and enthusiastic practitioners of surgery. There is no surgical possibility that has been achieved by any surgeon anywhere that has not been paralleled by these men. There is no truth or suggestion of advance presented in any tongue or nation that is not seized with avidity by them and submitted to the test of experience by their practical and trained intellects. Their work is held in honor, not only by their professional colleagues, but also by an intelligent and discriminating public, and I regret that it is not possible for me at this time even to begin to enumerate the leaders of this army of surgical workers. I do not think that I am wrong in saying that among the American people surgery has always been held in greater esteem than internal medicine. The very freedom and clashing of theories and methods which have prevailed in medicine have tended to create a wide-spread distrust of the real merit of any of them. In surgery, however, there has been something tangible which could be seen and measured and judged by all. The merit which is gladly accorded in this land to any worker who can do anything well has been freely accorded to the successful surgeon. In a land where there is no hereditary leisure class, where all work has been honorable, the manual element of surgical work which has caused in other lands, until very recently, a certain social taint to attach to its practitioners, has in no way detracted from the social standing of the surgeon. While greater honor has been accorded him, greater responsibility has likewise been exacted from him. The frequency of malpractice suits in America has, doubtless, its origin in the prevailing sentiment that whoever offers himself for surgical responsibilities must be first fully equipped to discharge them,

or else be held accountable for the result of his shortcomings. It has always been recognized that "surgery forms a part of medicine," so that up to the present time there has never existed in America a class of surgical practitioners distinct from physicians. In those comparatively few instances in which, by a process of natural selection, practitioners have come to limit their work to external medicine and operative efforts, it has been as a development from the status of a general practitioner.

The demands of the present day as to the training of him who shall undertake any part of the healing art are multiplying greatly. The interests which are at stake are too great to allow any possible source of useful attainment to be neglected. The complexity, the abstruseness, the wide-reaching relations of many of the branches of knowledge, mastery of each of which is essential to the fully-equipped physician, are such as to require, as never before, well-trained minds to approach the study of medicine. If Frederick II was right 700 years ago, that no one should be admitted to the study of medicine who had not given himself at least three years to the study of "logic," certainly in these days a no less full course of training in those preliminary studies that tend to develop the reasoning and observing faculties, and to furnish the mind with a sufficient store of general knowledge is required from the medical neophyte who aspires for excellence in his profession. The ability to master the principles and to become skillful in the practice of the medicine of to-day—meaning by this the science and art of healing in its broadest sense, requires, in the highest degree, a trained mind, a trained eye, and a trained hand. Each decade has witnessed in this land a notable increase in the facilities for obtaining this training which has been furnished those who seek it. No men have been more ready to realize its importance, or to impress on the general public its necessity, than the great body of physicians of already mature age who themselves were denied it. As individuals and as organized societies they have always been the leaders in securing the advances in medical education which have been steadily going on, and are still in progress.

As a result, in the great universities of the country, courses, especially preparatory to the study of medicine, have been instituted; the number of students who bring with them to the benches of the medical school minds already well disciplined in the study of the humanities and the sciences has greatly increased; the courses of study in the medical schools have been multiplied, lengthened and systematized; laboratories have been equipped; dispensaries and hospitals have been furnished, and clinical training, to a very considerable degree, has been added to experimental and theoretical teaching. The friend to humanity who stops to consider the present condition of training in this country will be pleased, however, not so much with what has been done already, but with the ever-widening influences which it is evident must accrue in the future. Among the schools, a certain rivalry as to which shall furnish the best and most comprehensive training, among the people, a higher ideal of what their physician should be, and a better appreciation of the value of positive knowledge and trained skill, and among the practitioners of the healing art themselves, through the working of the law of the survival of the fittest, a steady elevation to higher types of training and attainment. The relation of these influences, now enumerated, to the creation of a high type of surgical character and achievement, is manifest. I turn to my dictionary and find that a surgeon is defined to be "one who performs manual operations on a patient." I appeal to philosophers and educators, and find that the highest type of mental development requires for its attainment not only the training of the intellect, but the exercise of the hand as well.

I survey the history of medicine, and find that only as the labor of the hand has become honorable and its skill has been brought to the unraveling of the mysteries of life and disease, has any progress been made. Knowledge in physiology, pathology, histology, bacteriology, anatomical research, are all the fruits of special manual efforts, and are cultivated only in *labor*-atories. I look over the revelations of disease as brought to light by modern research, and find an ever-increasing number that are most surely relieved by

methods that require manual interference. I inspect the methods of modern surgery, and find that its manual operations are no longer chiefly the setting of broken bones, the extraction of teeth, the opening of veins, the application of plasters and poultices, the introduction of stitches, the incision of abscesses, or even the amputation of limbs, but that they are examples of the most perfect technique of philosophical research, often intricate and delicate, invading the most hidden recesses of the body, sparing no organ, not even the heart or brain, but going everywhere, in their mission of mercy, where a distinct condition susceptible of possible relief has been demonstrated to be present; that they require for their suggestion and for their guidance the most intimate knowledge of the processes of life and the disturbances of disease, and the most thorough and exhaustive application of all the resources of diagnosis; and that in their execution they require cool judgment, strength of nerve, confidence in ability to overcome difficulties, and physical endurance to guide and control the skilled hand that performs the work.

The surgeon of the present day, therefore, if we are correct in the statement of the conditions that have attended his evolution, is necessarily a physician in the broadest sense. One of the peculiarities of the medical profession of this country has been the frequent use of the double title of "physician and surgeon" by the practitioners of the healing art. I have thought that its use was becoming less frequent than formerly. Perhaps, indeed, it is not necessary, since the one word, physician, "one who practices the art of healing," is broad enough to cover the whole field of medicine, whether therapeutical or operative. At all events the custom of coupling the two terms together has been significant of the attitude of the American people to surgery as being a part of medicine. It is in a line with local custom and traditional use that in concluding this sketch of the evolution of the American surgeon I present him under the words, a *physician and surgeon*. To no man is it given to possess in a perfect degree the highest qualities of his type, but to many of the men who are doing the surgical work of this land to-day, the common voice of an

enlightened public and their discriminating colleagues, can attribute with justice in an eminent degree the same qualities which were conspicuous in the leaders of surgical endeavor 400 years ago; we delight to honor them just in proportion as we see in them the erudition and regard for past experience that marked a Vigo, or the broad culture and philosophical attainments devoted to pathological research and clinical observation of a Benivieni, or the devotion to unraveling the mysteries of the human frame, and the fearlessness of operative attack, and the energy and character of a Carpi.

LEWIS S. PILCHER.

## INDEX OF SURGICAL PROGRESS.

### GENERAL SURGERY.

**Infection from Contact, in Epithelioma.** By OVE HAMBURGER (Copenhagen, Denmark). A woman, fifty years of age, presented an epithelioma of the size of a hen's egg, upon the inside of the left labium minus, which had developed during the course of two years, without further extension. In the right labium minus, the point of continuous contact with the tumor, there was an ulcer of the size of a cent, with elevated edges. After extirpation both the tumor and the ulcer proved, microscopically, to be epitheliomatous. The writer regards this as a case of infection from contact, and cites several analogous cases from the literature.—*Hospitals-Tidende*, R. 3, Bd. 10, S. 81.

FRANK H. PRITCHARD (Norwalk, Ohio).

### VASCULAR SYSTEM.

**A Case in which Successive Aneurisms were Treated by Ligature of Four Large Arteries.** By ALEX. O. MACKELLAR, F.R.C.S. (London). A man, aged thirty-four, by occupation a police constable, and previously a soldier in Egypt and a professional sprinter, who had made 100 yards in ten seconds and a quarter, had been affected with venereal disease, but presented no certain history of syphilis; four years previously had developed a right popliteal aneurism, attributed to a fall. This was readily relieved by ligature of the corresponding superficial femoral. A year later, with no history of injury, he appeared again with an aneurism of the other popliteal; digital compression was tried for thirty-one hours without effect, but ligature of the left superficial femoral was successful in curing the dilatation. At this time he presented a pulsating aneurismal tumor behind and above the manubrium sterni; for this aneurism the right common carotid and the third part of his right



subclavian were simultaneously ligatured ; the former with silk and the latter in two places and divided between. These operations arrested the growth of the aneurism only temporarily, and it subsequently gradually increased and ruptured through the skin, inducing fatal hæmorrhage. The autopsy showed that the last aneurism arose not from the innominate but from the front of the arch, springing up in front of the innominate. The right femoral artery was occluded for about three-quarters of an inch at the seat of ligature except for the diameter of a very fine bristle, presenting a tiny winding canal crossed by several perforated diaphragms ; the coats were uninjured, but were apparently not quite brought into contact by the ligature, although the vessel was practically impervious ; no trace of the ligature could be found ; above and below the seat of the ligature the vessel was patent, but much diminished in size. The vessel was patent below down to the aneurism, where the popliteal artery and the aneurism together were converted into a small mass of connective tissue. The left femoral, which had been tied with a stay knot three years before, was blocked at the seat of ligature by organized clot for about half an inch ; in this were minute holes which a bristle would not pass, owing to the openings in the successive diaphragms not corresponding. In other respects the conditions were the same as on the right side. The right common carotid presented its coats uninjured in contact and adherent for three-quarters of an inch, the whole length of the vessel above and below filled with clot and the ligatures encapsulated in connective tissue. In all three cases the whole seat of ligature was enveloped in a small fusiform mass of connective tissue. The proximal end of the subclavian presented no clot whatever, although the inner coat was incurved, and the nearest branch an inch and a quarter from the seat of ligature ; the distal end presented a clot extending to the first branch, half an inch.—*London Lancet*, December 3, 1892.

JAMES E. PILCHER (U. S. Army).

## HEAD AND NECK.

**A Report of Twenty-two Cases of Intubation of the Larynx.** By JAMES B. BALL, M.D. (London). The author reports twenty-two cases, ranging in age from thirteen months to eight years, in ten of which recovery occurred. The indication for intubation in every case was acute laryngeal stenosis threatening the life of the child, tracheotomy being the only alternative. Two cases were due to traumatic causes, swallowing very hot tea and carbolic acid, and the rest to laryngitis, simple or membranous. In five cases the disease was secondary to measles, and four of these died. In seven cases tracheotomy was afterward performed, chiefly because the tube seemed to be clogged with membrane or secretions, but all of these died. In the cases which recovered the tube was left in place from three to thirteen days, eight being the average. The thread was allowed to remain in four cases, in one of which it was used by the child to drag the tube out. In the remainder it was removed immediately after the introduction of the tube, and the author considers this the best plan. The author remarks on the fact that the bloodless character of intubation will cause the family to permit it, when operation would be positively declined, and cites two cases in point.—*London Lancet*, November 26, 1892.

JAMES E. PILCHER (U. S. Army).

## CHEST AND ABDOMEN.

**I. Statistics of Cases of Empyema Treated from 1874 to 1891.** By J. C. HOLST (Christiania, Norway). The writer presents the statistics of twenty-three cases of empyema treated from 1874 to 1891. The cases were irregularly distributed through these seventeen years; in a few places there was a tendency to endemic cumulation. Out of these twenty-three cases eleven recovered and twelve not cured. Three of the latter were in such a condition that the operation was not undertaken. The average duration of the disease, before operation, was, in the cases that recovered, 5.6 weeks; in one, 20 weeks. On the contrary, in those not cured by opera-

tion, it was 11.5 weeks. The primary affection in four was pneumonia, in four pleuritis, and in two influenza. In three cases there was expectoration of a purulent sputa, all of which ended fatally, though one was operated on. In one of those operated on who was not cured by the operation, fetid pus was found. In this case the empyema was ascribed to a fall, with probable lesion of the lung. As to complications among those operated on with success, in one there was pericarditis and in another erysipelas (twice). In those unsuccessfully operated on purulent pericarditis was noticed once, tuberculosis once, in one case pleuritis appeared on the opposite side, and in two multilocular encapsulation. Since 1884 the writer resects one of the ribs, either the sixth, seventh or eighth, with subsequent irrigation with a solution of boric acid. The irrigation is repeated only in case of a purulent discharge. In 1891 he had operated upon three cases, among which influenza was the cause in two, while the third was of traumatic origin. In this latter the discharge was fetid, with later appearing subcutaneous and multiple abscesses, which were partly absorbed. All these three cases went on to a successful termination.—*Norsk Magazin for Lægevidenskaben*, p. 45, 1892.

**II. Cancer of the Cæcum and Its Extirpation.** By M. W. AF SCHULTEN (Helsingfors, Finland). The writer operated, successfully, upon a cancer of the cæcum and ascending colon. The degenerated piece of intestine was resected, circular intestinal sutures applied, and the intestine replaced in the abdomen. The whole subject is completely considered, with regard to diagnosis, treatment, prognosis, etc.—*Nordiskt Medicinskt Arkiv*, Bd. 11, Häft 3. 1892.

**III. Treatment of Gangrenous and Possibly Gangrenous Hernia.** By THORKILD ROVSING (Copenhagen, Denmark). The writer, after describing Poulsen's method of treating gangrenous hernia by freely drawing forth the intestine and keeping it under observation for a short period, is of the opinion that this method will be found of service in treating suspicious cases. All the suspected portion of intestine is drawn out of the abdomen and kept under

observation; if it remains normal replace it; in case it sloughs, treat the anus praternaturalis. He cites the following case in support of his views: A woman, forty-three years old, presented a left-sided inguinal hernia which had been incarcerated three days. In the hernial sac a bluish-black piece of intestine, eleven centimetres in length, together with a small piece of omentum, was discovered. The omentum was removed. The gut was loosened from its adhesions and drawn forth. At the place of incarceration it was of a dull color, blackish in several spots, and at one place the serous investment was bursted; on the upper portion several blackish, dull spots were observed. As gangrene was feared, enough intestine was drawn out to make a loop twenty centimetres long outside the abdomen and in the hernial sac. The case ran a normal course: no reaction. The dressing was removed the fourth day after the operation; the gut was of a normal red appearance, without a sign of gangrene. The sutures were removed, the intestine replaced, the hernial sac and cutaneous wound closed, merely a small drainage tube being left in the wound. The case ran a favorable course, and she was discharged with a truss a month after the operation. In addition to the above, the writer refers to two other cases of certain gangrenous intestine where this method was employed. Both patients died; the one, a fifty-six-year-old woman, with an inguinal hernia, the next day from acute peritonitis, and the other, a seventy-three-year-old woman, with a crural hernia, from apparent sepsis, due to a phlegmonous inflammation of the hernial wounds, a few weeks after the operation.—*Hospitals-Tidende*, R. 3, Bd., 10, S. 465.

**IV. Bacteriological Examination of the Fluid in Incarcerated Hernial Sacs.** By THORKILD ROVSING (Copenhagen, Denmark). The writer has made a bacteriological examination of the fluid contained in five incarcerated hernial sacs. Neither inoculation in agar-gelatine, nor microscopic examination, revealed the presence of bacteria. In four cases the gut was in a condition to be

replaced. The incarceration had lasted for a varying period: in the first and second cases twenty-four hours, the intestine being reddish-blue, smooth and shining: in the third incarceration had lasted seventy-two hours, the fluid being clouded and serous and the intestine bluish-black. It was allowed to lie outside the abdomen for ninety-six hours, after which it was replaced. The fourth, an umbilical hernia eight centimetres in length, was incarcerated twenty-six hours: the fluid was profuse, of a brownish-red color and stinking: a portion of the colon was included in the hernia, and was of a dark greenish color, but the serous coat everywhere shiny. In the fifth case the incarceration had lasted for forty-eight hours: in the sac were two spoonsful of dark, brownish liquid, while the gut was bluish-red and shining. The writer has also examined the liquid of two cases of hernia of ancient date, where the sac did not communicate with the peritonæum. In one the culture was sterile, while in the other, where the sac contained several cysts, in one of them a pus-like liquid, revealing microscopically numerous pus cells and staphylococci, was discovered. Cultivation developed the staphylococcus aureus. Here the infection was presumably of ancient date, as about fourteen years before, during an incarceration, the patient's hernia had been manipulated daily for several weeks before reposition was successful.—*Hospitals-Tidende*, R. 3, Bd., 10, S. 489.

**V. Operative Treatment of Prolapsus Ani et Recti.** By JOHN BERG (Stockholm, Sweden). The author, in a paper read before the Swedish Medical Society, points out the uncertain results of the methods of operation, up to the present in vogue, in the surgical treatment of this affection. He mentions three severe cases of prolapse of the rectum where he operated by an abdominal incision, as in iliac colotomy, reducing the prolapse by drawing up the sigmoid flexure and the upper portion of the rectum, with subsequent fastening of the gut in this position by silk sutures, placed through the whole thickness of the meso-rectum and the parietal peritonæum. He operated as Jeannel and Verneuil had done before him, though

unknown to him at the time. The paper was followed by a discussion, in which Dr. Josephson described the method by which Thure Brandt treats rectal prolapse. Though he has had no personal experience with it, he communicated a severe case which was successfully treated by Dr. Krumpf, of Vienna, one of Brandt's followers. Dr. Lindblom reported a successful case treated by this method. Dr. E. Peterson, on the contrary, has not observed a single case where success could be said to have been attained, though it was tried in several. The writer, with regard to this latter method, stated that he could not see how one could expect to grasp the intestine sufficiently through the abdominal walls, and exert strength enough to raise the gut from the pelvis. This he has found very difficult, even with his hand in the pelvis itself.—*Hygiea*, 1892.

FRANK H. PRITCHARD (Norwalk, Ohio).

**VI. Thirty-eight Cases of Excision of the Rectum for Cancer.** By J. HARRISON CRIPPS, F.R.C.S. (London). Of upwards of 400 cases of rectal cancer examined by the author in fifteen years, in about one-half any operative treatment was advised against. Of the remainder 114 were operated upon, 38 by excision and 76 by colotomy. Of the 38 cases of excision 3 died from the operation, 35 recovered.

SUBSEQUENT HISTORY OF CASES THAT RECOVERED.

7	No reliable subsequent history.	
10	Recurrence within one year.	
5	Recurrence between first and third year.	
1	Died a year later without recurrence.	
1	No recurrence after eighteen months.	
10	No recurrence . . . . .	3 under 1 year.
		1 after 2 years.
		1 " 3 "
		2 " 4 "
		1 " 5 "
		2 " 6 "
		1 " 12 "

It will be seen that out of the 28 cases whose subsequent history can be traced, in 15 recurrence is known to have taken place, while in 12 no recurrence had occurred. In 7 of these over three years had elapsed, so that these cases may be considered as cures, and since such cases have more interest attached to them than others, the following brief facts concerning them are given :

DETAILS OF CASES THAT HAVE SURVIVED WITHOUT RECURRENCE FOR  
OVER THREE YEARS.

CASE I.—*After Three Years.*—E. C., aged forty-nine, was sent to me by Mr. Malcolm, of the Samaritan Hospital, and I operated at St. Bartholomew's in May, 1889. Three and a half inches of the bowel were removed, a narrow strip of unimplicated mucous membrane being left along the posterior wall, the disease being chiefly on the anterior half of the bowel. The disease had so invaded the septum that a portion had to be removed. The opening was closed by fine silk sutures. The patient, who had some albumen in the urine, convalesced very slowly. On her discharge from the hospital at the end of nine weeks the wound was practically healed, but showed a considerable tendency to contract, but by the persistent use of the bougie this was overcome. The albumen disappeared from the urine June, 1892. The patient is now in excellent health. There is a slight annular ring of cicatricial tissue just within the anus. There is no sign whatever of recurrence. The patient has fair control over her motions, except when she has diarrhoea.

CASE II.—*After Four Years.*—A gentleman, aged forty-one, under the care of Dr. Fletcher, was operated on by me in January, 1888. The disease was confined to the posterior half of the bowel; the lower border of the disease was one and a half inches from the anus, and the upper border four inches. It was closely adherent to the coccyx and lower sacral bone, but was dissected off without removing either bone. The patient for two years used a bougie daily on account of contraction. This has now entirely disappeared. He has become stout, and has been in excellent health ever since the opera-

tion. There is no sign of any recurrence (May, 1892), and the patient has perfect control over his motions.

CASE III.—*After Four Years.*—M. M., aged sixty-one, was sent to me by Mr. Doran, and was operated on by me in 1878. Two inches and a half of the bowel were removed. In three months there was a slight spot of recurrence, which was removed, the portion being not larger than a pea. About a year later a recurrence took place, and again a small nodule was removed. I frequently saw the patient during four years, and the parts remained thoroughly sound and healthy.

CASE IV.—*After Five Years (nearly).*—S. P., aged thirty-five, was operated on at St. Bartholomew's Hospital in October, 1887. The disease, which had surrounded the bowel, had extended high, and had implicated the lower half of the rectovaginal septum, a fistula having formed through which a fungoid mass protruded into the vagina. Rather more than four inches of the bowel were removed, including about half of the whole thickness of the rectovaginal septum. The wound was allowed to heal over a large-sized bougie, but notwithstanding this contraction gave some trouble, and for the first year she had very little control over the motions. By the end of the second year the tendency to contract had almost ceased, but as a precautionary measure I advised her to pass the bougie once a fortnight. In 1890 she was confined of a fine, healthy baby, and when last examined, in 1891, there was no sign of recurrence, the part being soft and supple. The appearance of the parts resembled what is seen in a bad case of ruptured perinæum, but the patient had acquired fair control over her motions.<sup>1</sup>

CASE V.—*After Six Years.*—The patient was a lady, aged forty. On the anterior wall of the rectum, nearly five inches from the anus, was a typical patch of adenoid cancer about the size of a florin. It could only be felt when the patient strained down, and the portion of bowel on which it was situated became invaginated. With the

<sup>1</sup> Since reading this paper a small nodule of recurrence was observed; this has been removed and the patient is now free from disease.



assistance of Dr. S. Smith, the patient's medical attendant, I removed the disease, dissecting it off together with a portion of the muscular coat, treating the remainder of the base with the actual cautery. In six months the disease had recurred. It spread at an alarming rate, and there was a growth the size of a five-shilling piece, with indurated, overlapping edges and a hard, ulcerated base. Assisted by my colleague, Mr. Butlin, I was enabled, by vulsellum forceps, after making the posterior cut, to drag the bowel some distance downward. I completely cut round the growth, including the whole thickness of the bowel wall, a portion of the peritonæum being removed and the opening closed with catgut sutures. Some contraction followed, necessitating the prolonged use of the bougie. There is still no sign of recurrence (July, 1892), and the patient has given up the bougie for two years. There is now a scarcely perceptible contraction, and patient has complete control over the motions.

[TO BE CONTINUED.]

## REVIEWS OF BOOKS.

DISEASES OF THE CHEST, THROAT, AND NASAL CAVITIES, including Physical Diagnosis and Diseases of the Lungs, Heart and Aorta, Laryngology and Diseases of the Larynx, Nose, Thyroid Gland and Oesophagus. By E. FLETCHER INGALS, A.M., M.D., Professor of Laryngology and Practice of Medicine, Rush Medical College, etc. Second edition, revised and enlarged. 240 illustrations. Octavo, 700 pages. New York: William Wood & Co.

The first edition of this work, made up essentially of lectures delivered before the students of Rush Medical College, was confined for the most part to the consideration of the subject of physical diagnosis as related to diseases of the chest, throat and nasal passages. In this edition the original volume is supplemented by the discussion of the etiology, pathology, symptomatology and prognosis of these diseases, to which is added an outline of the treatment appropriate to each, though the recommendations under this head are confined generally to measures that the author has found most satisfactory; in all other respects the book is designed to cover the whole ground so far as the practical needs of the student and practitioner are concerned.

While the author has consulted the literature of the subjects of which the volume treats "fully and extensively," he has incorporated into its pages only such views as he has been able to substantiate in the course of his personal experience, or as commend themselves to his professional judgment—a frank assumption of responsibility for its teachings which at the outset is a pledge of the honest and painstaking efforts to which the text bears witness.

A little more than one-third of the book is given up to the subject of the diseases of the chest. Apparently, the author anticipates criticism upon the propriety of grouping affections of this region with

those of the nose and throat in the remark that, since symptoms of the latter sometimes simulate those of pulmonary disease, they may properly be studied together. A more obvious reason is furnished by the fact that they are associated in the lectures upon which the book is based. This arrangement may be satisfactory to the medical student, but the division of the work into two volumes would have increased its value for the larger circle of readers to whom also it is addressed, as the ampler space thus provided would have permitted fuller consideration of treatment—a subject which, as regards diseases of the nose and throat particularly, has the greatest interest for the general practitioner. Indeed, the general practitioner can hardly hope to qualify himself for making diagnoses, which require above all things the skill in manipulation that can be acquired and maintained only by constant practice, for which he lacks opportunity: very little can be accomplished in this direction by reading, and he will probably continue to depend upon the specialist for a solution of this part of the problem—at least in difficult cases. The diagnosis having been made, however, he may reasonably expect his books upon special subjects to furnish instruction in detail as to measures of treatment—which he may be perfectly competent to carry out. But, notwithstanding the author's statement of the limitations of the volume in this direction, the reader in pursuit of information under this head will not lack for remedies; he is rather likely to suffer the embarrassment of riches. For example: among the heart tonics to be used in the treatment of valvular lesions the following are mentioned: digitalis, arsenic, cactus grandiflora, belladonna, squills, strophanthus, sparteine, caffeine, convallaria, nitro-glycerine and nux vomica, with the caution that these agents must not be used indiscriminately, to be sure, but save that certain contraindications to the use of digitalis are mentioned, no specific directions are given for the exhibition of the drugs enumerated. Considering the excellence and completeness of the treatise in other respects, it must be assumed that lack of space—the result of rolling two single volumes into one—is responsible for the omission to clearly set forth the conditions which should determine the choice of the par-

ticular remedy to be employed in each case. In view of the statement that the volume proposes to present only the outlines of treatment—though it certainly does more than this—this criticism is not warranted, perhaps: the point is, however, that it would have been of greater service to the profession had it been made complete in every part. The fault lies rather in the author's purpose than in the execution of it.

Especial attention is given to the subject of physical diagnosis of diseases of the chest. The physical signs are fully described, both their usual and exceptional significance being stated. The methods to be used in the examination of the nose and throat are also described in detail. The study of differential diagnosis has been facilitated by the frequent use of tables in which distinguishing signs and symptoms are exhibited in parallel columns. An appendix of fourteen pages contains formulæ for prescriptions to which reference in the text is made by numbers: they include numerous combinations of drugs suitable for local application and for inhalation. The index has been made very full, a synopsis of each article being given under its proper heading.

The operative treatment of nasal obstructions, etc., is described in detail, as is also the operations that the general practitioner may be called upon to do, as tracheotomy and intubation of the larynx (the latter is preferred in the case of children under the age of five years). What may be termed major operations, such as extirpation of the larynx and external cesophagotomy are regarded as belonging to the domain of general surgery, and, therefore, without the province of this work. In his descriptions generally, the author has the happy ability to make himself understood, and his exposition of the different subjects is clear, concise and thoroughly practical.

D. R. BROWN.

## FOURTEENTH SESSION OF THE AMERICAN SURGICAL ASSOCIATION.

THE fourteenth session of the American Surgical Association will be held at Buffalo, N. Y., May 30, 31 and June 1, 1893.

The following is a list of the subjects which have been selected for special consideration at the next meeting, with the names of the Fellows who have promised to prepare the opening papers upon the several subjects, and of those who are expected to open and take part in the discussions :

### *President's Address.*

1. *The Modern Treatment of Compound Fractures* : By Dr. Nicholas Senn, Chicago. Discussion by Drs. Roswell Park and F. S. Dennis.

2. *Hypertrophies and Degenerations of Cicatrices and Cicatricial Tissue* : By Dr. J. Collins Warren, Boston. Discussion by Drs. C. H. Mastin, G. R. Fowler and W. H. Carmalt.

3. *Surgery of the Gall Bladder* : By Dr. M. H. Richardson, Boston. Discussion by Drs. J. Ewing Mears, A. Vander Veer, W. H. Carmalt and Theo. A. McGraw.

4. *Surgery of the Rectum* : By Dr. A. G. Gerster, New York. Discussion by Drs. L. S. Pilcher, H. H. Mudd, and L. McLane Tiffany.

5. *Surgical Treatment of Cervical, Thoracic and Abdominal Aneurism* : By Dr. C. B. Nancrede, Ann Arbor.

6. *Surgery of the Prostate* : By Dr. J. William White. Discussion by Drs. Hunter McGuire, T. F. Prewitt, R. F. Weir and F. H. Gerrish.

7. *Treatment of Carbuncle* : By Dr. F. Lange, New York. Discussion by Drs. Robert Abbe, J. B. Roberts and J. S. Wight.

In addition to the above specially selected subjects, the following paper has been offered :

1. *Unreduced Dislocations of the Astragalus*: By Dr. Stephen Smith, New York.

NICHOLAS SENN, *President*,  
 J. R. WEIST, *Secretary*,  
 J. EWING MEARS, *Recorder*,  
 F. S. DENNIS,  
 JOHN S. BILLINGS,  
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## THE SEVENTH SESSION OF THE FRENCH CONGRESS OF SURGERY.

THE seventh session of the French Congress of Surgery will be opened at Paris, Monday, April 3, 1895, under the presidency of Professor Lannelongue, of Paris.

The first meeting will convene at 9 o'clock in the morning in the great amphitheatre of the Ecole de Medicine.

The formal inauguration of the Congress will take place at 2 o'clock.

The following two topics have been selected as the special order for this session:

1. *Fibrous Tumors of the Uterus.*
2. *Surgical Treatment of Tuberculous Affections of the Foot.*

The morning sessions will be devoted to visits to the hospitals and to miscellaneous topics.

M. Felix Alcan, publisher for the Congress, 108 Boulevard St. Germain, is prepared to give all information concerning the Congress.

S. Pozzi, *Secretary General.*

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# ON THE VALUE OF INTERNAL MEDICATION IN THE TREATMENT OF MALIGNANT DISEASE.

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THE phrase "malignant disease," in this paper, includes both cancer and sarcoma. The question is, "Can medicine, administered internally, be of any use in preventing and curing these diseases?" It is quite impossible to deal with this question adequately without some consideration of the question of operation. It is my intention only to allude to the question of operation in the case of malignant disease.

Here let me say that I look upon cancer and sarcoma as local affections at their outset; or they may involve an abnormal growth of the cells affected, from the irritation produced by some at present unknown waste material or leucomaine, derived from cells that are undergoing senile decay. For instance, the cells of the female breast at a certain age are no longer required for lactation, and so they become senile and waste away. It may be that one or both of these views will turn out to be true. At present I incline to the theory that these diseases are caused by the presence and the action of some, as yet, unknown micro-organism; or there may be several different micro-organisms, each producing its own peculiar affection.

<sup>1</sup> Read before the Medical Society of the State of New York, February, 1893.

In the early stage of cancer infection, a complete and thorough exsection of the implicated part or structure will, as a rule, give, or tend to give, immunity. This will be so if we can find any medicine that will destroy the outlying colonies of infection. Yet it may be that the surroundings of the patient are such as to renew the infection in some other part of the body—some part that is susceptible. If the infection occurs in or near the scar, it must be that the operation did not include all the foci of the disease, and so they have continued to develop. What I mean by surroundings of the patient may be summed up by saying that, in so far as my observations go, there are localities in which we are more apt to find the growth of cancer and sarcoma. One is reminded of the same fact in the origin of malarial diseases, as well as the origin of tetanus. But the habitat of the micro-organisms of cancer and sarcoma cannot be well investigated scientifically until the micro-organisms themselves have been found and identified.

For a number of years it has been my endeavor to determine, as far as possible, the value of drugs in the treatment of cancer and sarcoma. My work has been in two directions: I have medicated in conjunction with operative procedures. In those cases in which operations have been impossible, I have administered various drugs, and the object has been to find something that would in any way help my patients in their great need. Here I may mention very briefly some of the drugs I have used.

The bichloride of mercury has been given by me quite extensively in both cancer and sarcoma. And I cannot recommend its use; at any rate, those patients who were benefited by this drug were probably suffering from some form of syphilitic infection.

The iodide of iron appears to be negative in its action. In some cases it has seemed to be useful for a time; but it probably supplied the blood with iron, and helped to prevent or cure tubercular infection.

In a number of cases of sarcoma I employed the muriated



tincture of iron, and found that it would not in any way interfere with the progress of the disease. One may be excused for going over even old ground when there is no sure remedy for a fatal disease. I think we ought never to cease our efforts until we have found out all that can be known about these great enemies of our patients.

I have combined the muriated tincture of iron and the mercuric chloride, and have thought that sarcoma was sometimes mitigated in the severity of its course; but the effects are, if anything, only relative and temporary. In some respects these two remedies combine a tonic and a microbicide, but they fail us where we need most help. They will greatly relieve a patient with a syphilitic neoplasm, and will often cure a gummy tumor.

I have given the iodide of arsenic extensively, alone and in combination with the iodide of iron and the iodide of potassium. The following prescription is one that I can recommend:

R Arsen. iod., . . . . . gr. j.  
 Potass. iod., . . . . . ℥ ij.  
 Syr. fer. iod., . . . . . ℥ iv.  
 Tr. Calumb., . . . . . ℥ xxiv.

M. SIG.—Take a teaspoonful after meals in a wine glass of water.

The iodide of arsenic alone has not acted as well as the above combination. Yet it is just to say that no very marked control has been obtained over cancer and sarcoma by the iodide of arsenic. This remedy, in some cases, has appeared to be useful. Combined, as above indicated, it has cured enlargements of apparently doubtful nature, and so I have called them syphilitic. At any rate syphilitic deposits have been removed by this combination when other means have signally failed. In some cases the result has been better than I have obtained by the use of mercuric chloride.

Some years ago I began to give the carbonate of lime for boils and carbuncles and found it especially useful in recurrent cases. I gave it in the following way:

R. Cretæ prep., . . . . .	℥ iij.
Aquæ menth. pip., . . . . .	℥ x.
Tr. calumb., . . . . .	℥ xx.

M. Stg.—Shake and take a teaspoonful in a wine glass of water immediately before each meal.

In some of the more serious cases of these affections I gave the bromide of arsenic in one-fortieth grain doses after meals, and found that my patients got well faster than on the carbonate of lime alone. It seemed to me that both of these remedies had the power to destroy the micro-organisms that were the irritants in the cases of boils and carbuncles.

Here let me remark that there are no specifics in the treatment of disease, a saying not new, but yet very true. If we could cure all disease everybody would finally die of old age, if no accident occurred. But this is not likely to prove to be the case. Because patients die of grave diseases we do not, therefore, cease to give them aid, and leave them to the tender mercies and the ignorance of the empiric. Nor should we do this in the case of cancer and sarcoma; for if we cannot cure it is our duty to prolong life and make it more bearable while it lasts. It is not our business, either, to throw stones at those who, true to their mission of healing, give their time and energy to patients in the grasp of diseases which seem to have been well called malignant. Our business is to keep the micro-scavenger from becoming the destroyer for which every one has a mortal dread.

To resume: Not only in cases that I had operated upon, but also in cases in which operations were impossible, I began to give both the bromide of arsenic and the carbonate of lime. It is not my purpose to give clinical histories of these cases, but I desire to present in brief the general results of such treatment. The carbonate of lime was given in five to ten grain doses in the tincture of calumbo, before meals; and the bromide of arsenic was given after meals in one-fortieth to one-tenth grain doses. In many cases coming under the head of sarcoma there was quite a rapid tendency toward a cure, and this was generally permanent. Large deposits as a rule would not yield; but excision of the enlargement was often followed by a sure cure. As to cases

affecting bone, osteo-sarcoma, the treatment was not so favorable; yet even then the disease was more or less retarded in its progress. And it would seem as if these remedies were competent to remove small deposits or small points of infection in the vicinity of the neoplasm which had been excised.

I am not ready to say that all cases of sarcoma are the same disease in every respect. It would not be a surprise if the disease we call sarcoma had more than one kind of cause, and that there would be found in the future more than one kind of micro-organism at work producing this neoplasm. For we may admit at least two other factors: (1) It might happen, if there is only one kind of micro-organism, that in one case it is more virulent than in another; and that in its less virulent form the remedy might act with greater promptness and certainty: (2) Or it might be in some persons that, as we are prepared to admit, the cells of the body are able to resist the infection, so that it cannot begin its deadly work. In brief, if we have a resisting constitution or diathesis and, at the same time, an infection of minimum virulence, we may hope for immunity and, in case of attack, a prompt and effective action of the remedy. On the other hand, a virulent infection acting among non-resisting cells would give us a serious case, and one that might not yield to the influence of remedies. At any rate, these statements comport with the facts of practice; for I have seen some cases yield at once to the treatment that I have brought forward, and I have seen other cases also that would yield only slowly and under large doses of the bromide of arsenic; and there are other cases still that defy the action of all drugs.

Here I may briefly say that good results have been obtained in the treatment of sarcoma by other preparations of arsenic; and I may add that the bromide of arsenic has given me the best results. It will be impossible for me to give in this place the good results obtained by others in this important field of work.

It would be too much to expect the surgeon, in our present state of knowledge, to lay aside operative procedure in cases of cancer, and rely upon any as yet known internal remedies. Of

course, we make an exception in any cases upon which it is impossible for any reason to operate. In a case of cancer, since this disease, as I view it, is at first a local infection, I have advocated on more than one occasion that it is best to operate as early as possible. My point is this: Give the bromide of arsenic to all patients as soon as they come under your care, and continue the use of this remedy for a long time after the operation. The importance of the operation is admitted. At the same time I have some evidence of the value of this kind of medication in the cases under consideration. It is impossible to report all my cases in this place; my statements must be general, and by way of conclusion.

A considerable number of cases of cancer, operated upon by me three, four and five years ago and then treated for a time, say from six to twelve months, have been completely restored to health, and the scar of the operation is now in every way just as normal as it would be if we had union of a wound of perfectly healthy tissue. In none of these cases, so far as I now remember, did the microscope fail to confirm the diagnosis.<sup>1</sup> Nor does there seem to be the remotest reason to suspect a recurrence, unless the original cause of the infection were put in operation. I know it will or may be said that the results of my cases would have been the same after complete and thorough operation, even without the subsequent treatment. Yet, as the practical matter comes to my mind, I confess that, as I am now impressed, a case would be neglected if the above treatment were omitted. And I am the more inclined to this view since I know of no other way as useful.

In a considerable number of cases of cancer which were of such a nature that they could not be operated upon, I have given the bromide of arsenic, and have been reasonably certain that the progress of the disease has been modified and its severity mitigated. In one case for several months the patient was so relieved of her pain after she began to take the bromide of arsenic that she left off the use of morphine internally and cocaine externally, and at two or three different times, when the arsenic was omitted, the pain would return in all its torturing severity. This remedy

<sup>1</sup> Professor Van Cott made the greater number of examinations for me.

seemed to act upon the tissues adjacent to the neoplasm, retarding its growth and extension, thus preventing it from pinching the ends of the sensitive nerves. My observations are such as to lead me to say that the bromide of arsenic is incompetent to destroy the infecting material in the body of a new growth. The removal of a neoplasm must be by means of a caustic or by an operation. Internal remedies must be directed toward the prevention of the dissemination and the extension of the cancer micro-organism. It is still true that advanced cases of cancer are hopeless under any plan of treatment yet known.

I have in my mind several cases of cancer of the internal organs, in which the use of the bromide of arsenic brought relief and the prolongation of life. Indeed, such are my conclusions. These cases, as we knew, were hopeless under any plan of treatment hitherto employed, and as any one will admit a doubtful remedy is better than none, for so the traditions of our profession run, I, therefore, gave this remedy and became satisfied that it was more or less useful. In some cases far advanced, when the stomach has been irritable, the bromide of arsenic could not be taken. Here let me say that I would not expect to cure a patient in the last stages of cancer disease any more than I would expect to cure a patient in the last stages of tubercular disease. Permit me to add: We have found the micro-organism of consumption, but we have not found the micro-organism of cancer, and we have not a sure cure for consumption as we have for malaria; nor have we as yet any sure cure for cancer. And yet some cases of consumption are cured, and I also think that some cases of cancer are cured; that is, eradicated. The intrinsic difficulty and obscurity of the case does not mean that we ought to give over the treatment of our cancer patients and leave them to the perils of an unwise empiricism.

In this place let me reason as follows: Some cases of cancer are slow in their development; other cases are very rapid in their course; these facts add to the difficulty of determining the value of any drug given internally. Further, some cases of cancer disease seem to yield to operation and internal treatment, while other cases, no matter what we may do, keep right on in their

deadly work. As we have said in regard to sarcoma, it may be that there is more than one kind of cancer micro-organism. So that we may have more than one kind of disease under the head of cancer; or, if this is not so, then the cancer micro-organism is much more virulent in some cases than in others. We may add, the cells in one body may have greater resisting power than those in another.

It is evident that the internal treatment, as we have indicated it, of sarcoma is of more value than that of cancer. I have in mind the use of arsenic bromide. For the bromide of arsenic, as I view it, is better than the other preparations of this substance. In this plan of treatment of sarcoma I find the addition of the carbonate of lime useful. The bromide of arsenic is also useful in the treatment of cancer, but I am not yet prepared to say how far the additional use of the carbonate of lime is of advantage. The general plan of treatment of cancer disease should be conducted upon the same principle we employ in the treatment of other diseases. Our aim must be two-fold: (1) to destroy the infection; (2) to fortify the cells in their work of resistance. And we may add, the desideratum is some drug that acts upon the infecting micro-organism, and will do no harm to the cells of the part invaded. In this direction lies the field of great therapeutic triumphs for the future, doubtless, and when the time comes our art and our science will be more exact than at present.

It is gratifying to know that others are working on the same line and in the same direction with other drugs. This means that the appeal, silent though it may be, coming from the afflicted for help, has not been neglected by the large-hearted men who are working for the relief of human suffering. It is our earnest wish to have our hopes in the coming time fulfilled, that the long-defying secret of this dread disease will be explained, not only as to its nature, but as to its remedy. I know of no malady that strikes the sufferer with such appalling dread as this one that we call cancer. The more I see of it, and I have seen much, the more my sympathy is touched. And as I sit or stand by the wayside of human endeavor, I appeal to my professional brothers, one and all, to give this great and difficult problem their earnest

attention. Anything that will aid us in the least must not be put aside. And any one who in real earnest will give his best thought and best work to the solution of this great problem, even though he fail to help us, I will take by the right hand, and say to him: "Thou hast labored well in a good cause." And I grudge not him who, if it may turn out so, that finds by chance, let it be, the remedy, whatever it may be, for this great scourge of mankind, the most feared of all, not even excepting the plague, for that will not leave one to a slow death, every step toward which may be marked with unspeakable torture.

# THE USE AND PLACE OF CAUSTICS IN THE TREATMENT OF CANCER.<sup>1</sup>

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I HAVE taken the liberty of substituting the word "cancer" for carcinoma in the discussion of this topic. The dual use of the term carcinoma, first, to designate a tumor of a definite histological structure, and second, a general term, including all malignant neoplasms, leads to endless confusion of ideas in the minds of many students. The advantages of having a general term devoid of ambiguity is apparent, and until we find one more suitable, the term "cancer" is a convenient one for all growths which present the following characteristics, as formulated by Dr. Snow:<sup>2</sup>

(1) Resistance to all known medicinal agents. [Under this head it is fair to assume that no medicinal agent has yet been shown to produce a complete cure of the disease, although decided modifications of the morbid process have been frequently reported.—D. L.].

(2) Proneness to invade other organs and tissues than those in which the disease has originated.

(3) Liability to recur after removal by caustics or the surgeon's knife.

(4) The pain to which it commonly gives rise.

(5) The tendency to destroy life.

In general terms, it may be stated that no caustic applications

<sup>1</sup> Read before the Medical Society of the State of New York, February, 1893.

<sup>2</sup> Clinical Notes on Cancer, by Dr. Herbert Snow, London, 1883.



should be employed in the treatment of cancer except those which may be termed potential escharotics. Anything short of the same prompt and complete eradication of the disease as could be effected by the knife should not be considered, except as some peculiar condition of the patient may indicate a departure from this rule.

The theory of Unna, Dühring and their disciples, that mild applications, such as resorcin, pyrogallol and aristol may bring about a modification of cell structure which will render the disease benign in its tendency, is a plausible one, which has often led to a condition as hopeless as it is inexcusable. Walshe was correct when, as long ago as 1846, he laid down this principle :

“Escharotic agents should be applied in such manner as to produce the requisite effect, if possible, by a single application, otherwise the irritation gives, not necessarily, but commonly, new activity to the disease.”

The danger resulting from mild cauterization I have been able to verify in the study of a large number of cases, of which the following history is an illustration :

A man, thirty years of age, suffered some inconvenience from a small fissure of the lower lip in its median line. He was in excellent health, a farmer, with no specific history or hereditary tendency to cancer. A physician made applications of nitrate of silver to the lip about twice a week for nearly a year, when the lip had become enormously thickened and indurated, ulceration had commenced, and the submental and sublingual glands were extensively involved and the seat of constant severe pain. The case had become an inoperable one, and the patient died three months afterward. I have been unable to find a better word to describe such management of the case than malpractice.

The proper place of caustics in the treatment of cancer cannot be easily defined within the limits of a brief paper.

Should they ever be preferred to the knife in an operable case ?

If we take cancer of the female breast as an example, I should without hesitation answer the question in the negative. Some-

times a palliation of symptoms may be temporarily secured by applying a caustic paste to portions of a recurrent disease in the breast, but that is as far as we should ever undertake the use of caustics in these cases. The results of caustic treatment in breast cases are frequently brought to our attention. One lady had an axillary growth "drawn out" by a cancer doctor, and the resulting cicatrix bound the arm so tightly to the trunk that we could not even examine the axilla until she was etherized. All surgeons are now practically agreed, I hope, that the axillary contents should always be removed as well as the tumor of the breast, and caustics cannot safely be used in the axilla. I would not make the exception which Jennings does in favor of caustics in very old and debilitated subjects, for with local anæsthesia not only small tumors, but even those involving the entire breast, may be successfully removed. Mr. Jennings' opinion regarding caustics as a general means of treating tumors of the breast is one of most decided disapproval.<sup>1</sup> He declares that "when caustics are employed to destroy a cancerous growth of any considerable dimensions the results are far inferior to excision or amputation under modern conditions. The bulk of the growth is hardly ever eradicated, and manifest local recurrence occurs ordinarily after the lapse of a few weeks. The caustics are applied and reapplied, and this sad treatment goes on until the patient is relieved by death of a treatment which adds pain to that of the disease which it ordinarily aggravates."

Cancer of the breast, then, heads the list of cases where caustics are not admissible, and with increasing experience I am inclined to include uterine cancer in the same category. Some cases of disease confined to the vaginal portion have, perhaps, been cured by the actual cautery, by chromic acid, perchloride of antimony and the like (caustic pastes should never be employed), but it seems that the melancholy conclusion is to be forced upon us that the only hope of permanent relief is by an exceedingly early diagnosis and then removal of the entire uterus. Whenever even a probable diagnosis can be reached no time should be wasted with caustics.

<sup>1</sup> Cancer and its Complications, London, 1889.

The objection to caustics applies with equal force to their employment in cancer of the tongue, tonsil, eyelids and orbit, or any disease involving a large extent of mucous surface, of which cancer of the rectum is a good example.

All the objections to caustic treatment disappear, however, when we consider cutaneous cancer, which is usually treated more satisfactorily by escharotics than by any other method, and for various reasons. The patients are usually past middle age and often far advanced in years and, as a class, not good subjects for etherization. The antipathy to a surgical operation often leads them to delay treatment until the pre-cancerous stage, as Mr. Jonathan Hutchinson has termed it, has been followed by one of active malignancy. You can always quite readily persuade them to have a plaster applied. The disease can be thoroughly destroyed by caustic applications, which will act sufficiently upon diseased tissue without destroying the healthy skin, so that there is almost an excuse for the fallacy that they exercise a positive power of selection. The resulting cicatrix, when the deep subcutaneous tissues are not involved, is a smooth, white, and in every way healthy one, and far less conspicuous than those remaining after operation. The only cases in which an operation should be preferred to a caustic are those affecting the mucous surface of the lip, the eyelids, and all others which have involved a large surface, in which dangerous poisoning might result from absorption.

The choice of a proper escharotic is of considerable importance. If the disease be a small warty growth the potash and cocaine paste of Mr. Jennings is a good one, the composition of which is as follows :

R.	Hydrochlorate of cocaine, . . . . .	2.
	Caustic potash, . . . . .	12.
	Vaseline, . . . . .	6.
M.		

Acetic acid must be at hand to limit its action as soon as desired. Where the disease is that form of epithelioma called rodent ulcer by some, and Jacob's ulcer by other authors, with little or no induration of the borders, a paste composed of lactic acid and

*silicic* acid, in such proportions as to make a thick paste, is effectual in destroying the diseased surface. It has one advantage over others, in that it is not poisonous, and can be spread over a large surface. It is less active than the others, and requires frequent re-application. I now very seldom employ it. The actual cautery is too painful, and patients are much frightened by the very appearance of the doctor armed with a red-hot instrument.

In 1880, in a paper before this society, I described the method, then new, of applying an arsenical paste as recommended by Dr. Alexander Marsden, surgeon-in-chief of the London Cancer Hospital, and gave histories of twelve cases successfully treated by it. Since that time I have employed the paste in over 100 cases. It is usually satisfactory, and has received the indorsement of many authorities. In some instances the reaction is very great and the pain severe. It is composed of arsenious acid, two parts; mucilage of acacia, one part; mix into a paste too thick to run. It is then applied to only one square inch of the ulcer, covered with cotton to absorb any superfluous paste, and left on until some swelling of an inflammatory character appears around the borders of the plaster, when it is removed, and a line of demarcation usually surrounds the surface cauterized. From one to three days are required to produce the desired effect. Warm flaxseed poultices are then applied until the slough separates (usually about a week) when, if the disease is all removed, healing by granulation is prompt and uninterrupted. The same application is to be repeated, if necessary, until the disease is all destroyed. Marsden insists that no cancer of more than four square inches in extent should be thus treated, *and only one square inch at a time*, and the case very carefully watched. The surgeons of the London Hospital inform me that even Marsden himself now seldom employs the paste. They have substituted an application called Bougard's paste, after the Belgian surgeon who first published the formula in his work on caustics.<sup>1</sup> The author brought it forward as a cure for mammary cancer, but as such, in my judgment, it is open to the same objection as all other

<sup>1</sup> Etudes sur le Cancer, Brussels, 1882.

caustics; but in cutaneous and lip cases, and all surface epitheliomata, where an escharotic is admissible, this is decidedly the best we have at present. It is less painful than Marsden's, forms a more dry and friable slough, can be safely applied to a larger surface, and can always be ready for instant use, for in a covered jar it will keep for many months. With both pastes the surfaces must be denuded, if not already ulcerated, by caustic potash, to render the action prompt and effective in the shortest possible time. Bougard's formula is as follows:

R. Wheat flour, . . . . .	60 grammes.
Starch, . . . . .	60 "
Arsenic, . . . . .	1 "
Cinnabar, . . . . .	5 "
Sal ammoniac, . . . . .	5 "
Corrosive sublimate, . . . . .	0.50 centigramme.
Solution of chloride of zinc at 52°F.,	245 grammes.

The first six substances are separately ground and reduced to fine powder. They are then mixed in a mortar of glass or china, and the solution of chloride of zinc is slowly poured in, while the contents are kept rapidly moved with the pestle so that no lump shall be formed. A thick layer of this is spread on cotton and left in position twenty-four hours, and then managed in every way as Marsden's paste. Few cases require a second application. The ulcer may be dressed with balsam of Peru or aristol ointment of varying strengths, according to the stimulation required, and all exuberant granulations are to be kept in check by the usual methods.

# THE DOMAIN OF THE KNIFE IN THE TREATMENT OF CARCINOMA.<sup>1</sup>

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IN discussing the operative treatment of cancer it is all-important that we admit the infectious nature of carcinomatous tumors. This view accepted, and the first principle in the treatment is self-defined.

The extent of infection is not always readily determined. The apparent definition of the tumor is not its actual limitation. The length of time which has elapsed in the growth of the tumor is not the only criterion to establish its severity. Rapidity of growth implies intensity of infection. To cure the disease, all tissues infected, not only primarily but secondarily, must be removed. Measures which cannot reach beyond the area primarily diseased are of service only when the tumor is of very limited extent. As this cannot always be positively determined, their action is uncertain. The field of usefulness of caustics must, therefore, be exceedingly limited. Surgical measures alone are capable of coping with the malignant affection. Directed by an intelligent and skillful hand, the knife, more certainly than any other agent, is capable of removing the carcinoma and the tissues involved. Its utility and success depend upon many conditions. The patient must possess sufficient vitality to undergo the necessary surgical operation. As a *sine qua non* of success, the tumor must be operable—that is to say, it must be possible to remove every vestige of malignant disease. The surgical procedure instituted must be sufficiently radical to accomplish this. Above all, the early recognition of the carcinoma is most essential. Cancer

<sup>1</sup> Read before the Medical Society of the State of New York, February, 1893.

is more insidious in its invasion any other infectious disease. While the malignant tumors of the surface permit an early diagnosis, those involving organs concealed from view proceed so stealthily, become so firmly seated before making their presence known, that frequently, when their existence is positively assured, the growth is so extensive that complete removal is impossible.

Recurrence of cancer is a term frequently used. Its application is more often incorrect than otherwise. The early reappearance of a cancerous growth after its removal implies that the primary operation was not sufficiently thorough. Statistics in the case of cancerous disease are of but limited value in estimating the worth of operative intervention. The result of operation is not simply a matter of mathematical calculation. Individual cases must in themselves present the factors which are to determine the probability of their outcome after operation. Cancer of the lip, because of its prominent site, is speedily recognized; because of its accessibility, is easily removed; and the mild character of its infection renders it less apt to recur. It therefore yields a permanent cure in possibly 50 per cent. of the operated cases. Malignant tumors of the breast, which, for obvious reasons, reach the surgeon at a much later period of their growth, and are more widespread in their infection, are said to be permanently cured in 25 per cent. It is evident that these tables must include tumors of varying age, extent, rapidity of growth and histological character. I am inclined to believe that, operated upon at correspondingly early periods and equally favorable conditions, the results obtained would be much more nearly alike in these two forms of cancer. This statement applies to the removal of all carcinomatous tumors. The keynote of success is early operation, not merely in point of time, but early in the sense that the disease is still local. With additionally improved methods in surgical technique, and better means of securing wound repair, the operations of the future must present much more favorable statistics.

In operating there is greater danger of removing too little than too much. Recognizing the fact that malignant growths exceed their apparent boundaries, and realizing that the infection

has probably traveled along the known routes, be there visible evidence thereof or not, we must thoroughly investigate, at least, the condition of the lymphatics which may have become infected. The added dangers from more extensive operation are outweighed by the resulting benefits. Dealing with a disease which, left to itself, must result fatally, every step necessary to secure its complete removal is not only justified, but absolutely indicated. The partial removal of a cancerous growth, or the failure to carry away diseased lymphatics, cannot be too strongly condemned. Every surgeon knows that it is impossible to estimate the amount of lymphatic invasion without exposing these structures. The extent of lymphatic implication, where the external evidence thereof is either wanting or scarcely perceptible, is constantly a source of surprise to the operator. The axillary glands, for example, in one hundred and seventeen cases of cancer of the breast examined by Kuester, were found diseased in all but two instances. More than this, it is the universal experience of surgeons that a recurring tumor in the axilla appears in 90 per cent. of the cases. Even the fat lobules here present positive evidence of malignant invasion. It assuredly is poor surgical practice, because of the absence of external evidence of invasion of the axilla, to remove only the malignant growth which exists in the breast.

To what extent tissues beyond the area apparently involved should be removed is a most important question. Many surgeons of large experience, and whose opinions are entitled to respect, object to the removal of entire organs or parts of the body, insisting that the proposed operations are more extensive than the situation demands. While the ideal treatment of a malignant growth unquestionably is its complete extirpation, the performance of an operation more severe than is required is unwise, and no one justifies the exposure of the patient to unnecessary dangers. Yet, withal, nothing short of its thorough eradication is justifiable.

Of all forms of cancer appearing in women the breast is attacked in 26 per cent., as is shown in the study of 13,824 cases of primary cancer treated in the London hospitals. In 28 per cent. more the uterus is involved. Cancer of the breast being



encountered so frequently, and having been particularly the subject of study, furnishes an excellent text for the discussion of the principles of operative treatment.

In 90 per cent. of mammary cancers the tumor is apparently single, non-encapsuled and clearly defined. Studied microscopically, however, it is found to be widely infiltrating. Stiles has shown that small cancerous foci are found in parts of the gland quite removed from the site of the tumor. These cannot be regarded as independent foci, but are due to lymphatic infection. Lymphatic plexuses are so numerous in the mamma that a tumor located at the axillary border can by its infection involve the entire gland. Watson Cheyne has found secondary cancerous foci imbedded in bits of breast tissue possessing healthy acini, showing that the infiltration must have been through the lymphatics. It is not unusual to find a variety of changes in a cancerous breast, which, though not directly traceable to cancerous infection, are spoken of by careful pathologists as being a precancerous stage. Evidently then, at whatever site in the mammary gland the cancerous tumor may be located, we cannot assume that any part of the organ is absolutely free from invasion. Nothing short of the complete excision of the gland will certainly secure the removal of all diseased structures. But even this may be insufficient.

Local infection in its subtle invasion often exceeds these boundaries. At the German Surgical Congress of 1889, Heidenhain, speaking of the causes of the local recurrence of cancer after amputation of the breast, found as a result of the investigation of eighteen glands which had been removed in their entirety that twelve exhibited conditions which must have rendered the recurrence of the cancer probable. The removal of the entire gland had not completely removed the local disease. His studies lead him to conclude that the pectoral fascia is an exceedingly thin and illy-defined structure, not easily separated from the underlying muscle.

In lean women the mammary gland is in contact with the fascia throughout; in the corpulent, adhesions occur only here and there. After amputation of the breast he found that islands

of glandular tissue frequently remained. Coursing through the retro-mammary fat, vessels and lymphatics connect the gland and the pectoral fascia. It appears that in not less than two-thirds of the cases numerous metastases are present in these lymphatics. As a rule, even the carcinomatous breasts, which are fairly movable, exhibit cancerous invasion of the surface of the muscle. Where there is evident implication of the muscle, the statistics of Volkmann, Kuester and Helferich show that the mortality is exceptionally great. Of 65 cases, 56 died of recurrence, 7 were lost sight of, and only 2 were permanently cured. For these reasons Heidenhain believes that the necessity exists for removing with the mamma a continuous strip from the upper portion of the pectoral muscle. Should the muscle show any positive evidence of invasion, it should be very freely excised.

The uncertainty of determining at the time of operation whether the diseased growth has been entirely removed has in a measure been relieved by the introduction of what Howard J. Stiles terms his "nitric acid method." The mamma, immediately upon removal, is thoroughly washed in water until entirely freed of blood, as the blackening of bloody tissues by contact with the acid obscures appearances which are to be brought to light. The whole organ is then submerged for ten minutes in a 5 per cent. aqueous solution of nitric acid B. P. Following this, the breast is again washed in running water for five minutes, and placed for two or three minutes in undiluted methylated spirit. The mamma is now carefully examined to see if any part of the tumor is exposed, or whether cancer foci are apparent on the cut surface, or breast tissues are to be seen at any point. The effect of contact with the acid, because of its action upon epithelial structures, is to render all carcinomatous tissue of a dull and opaque white, while the fibrous tissues become gelatinous, translucent, homogeneous and like India-rubber in consistence. The fat remains unaltered. All this is done while the surgeon is clearing out the axilla. Before he is prepared to close the wound the investigation has been completed. In two cases Stiles was able to call the attention of Chiene to cancerous nodules no larger than a pin-head which would have otherwise been overlooked. Subsequent microscopic examination confirmed their malignant character.

Unfortunately, no equally ready means of determining the extent of invasion into lymphatic territory exists. Here the microscope is of service. The affected lymphatic glands, whether axillary, sub-pectoral, clavicular, or wherever located, together with the fat in which they are imbedded, must be thoroughly cleared away. The axilla is to be opened in every case, and the operation must be co-extensive with the disease. Failure to remove any site of secondary invasion endangers ultimate recovery as much as would an incomplete excision of the primary growth. The day of partial removal of the tumor or lymphatics is past. Cutaneous and subcutaneous structures overlying the malignant tumor must be as freely removed. With the new methods of skin grafting there need be no longer any hesitancy of leaving a large surface temporarily uncovered. Our aim now is not to secure primary co-aptation, if for its accomplishment we are to endanger the thoroughness of a radical operation. Few, however, will follow John Chiene, and close the gap resulting from the extensive removal of these tissues by utilizing a flap from the arm. The principles here enunciated apply with equal force to the removal of malignant tumors in any part of the body. It goes without saying that operating while the malignant disease is confined to the small area occupied by the primary growth, the required operation is not only less extensive, but its early and remote results are correspondingly better.

A very striking fact, made apparent in the study of the prevalence of cancer, is the growing increase of cancerous affections of the tongue in the male. Next to the skin it is now the most frequent site. Not only its prevalence, but the intensity of its malignancy, is to be deplored. While ordinary epithelioma is the most sluggish and innocuous of cancers, when affecting the tongue it is very acute, giving rise to rapid local invasion, and at an early day poisons the lymphatics. The difficulties surrounding its early recognition are indicated by Esmarch. In a very exhaustive paper he expresses the belief that the diagnosis cannot be based upon clinical manifestations. He urges the removal of a section of the suspected growth for microscopic study. The delay in establishing a diagnosis, associated with the dread of

operation, prevents the patient from receiving early surgical aid. The results, therefore, have been far from satisfactory. Of ninety-five cases operated on by Volkmann in the course of fourteen years, two died of the operation, and only three are reported by Krause to have been permanently cured. Schede, who undoubtedly seeks by operative measures to remove extensively all diseased and suspicious parts, reports that nine out of twenty-one operated upon died in consequence of the operation, but of those outliving it seven were permanently cured. At the same session of the German Surgical Congress Peterson, Esmarch, Bergman and Kuester reported permanent cures. While the removal *in extenso* of all diseased structures is essential, partial removal of the tongue is justified when the tumor is small and its site is remote from the raphe. The floor of the mouth must be cleared out, and lymphatic infiltration in the neighborhood of the sub-maxillary gland removed. Personally, my operations have not resulted satisfactorily in point of permanent cures. I have, however, had no difficulty in controlling hæmorrhage in any instance, nor have I been unfortunate enough to have seen septic pneumonia.

When seated in the root of the tongue the disease is particularly fatal. Here its rapid spread means the implication of structures which are beyond the reach of surgical art. All the more important is the appreciation of the first suggestive symptoms. Persistent neuralgic pains shooting to the ear and into the face, associated with a small puckering induration at the base of the tongue, bleeding easily upon manipulation, are warning signs.

The serious operations which this and other forms of cancerous disease may require bring us at once to the consideration of the question as to how far we are justified, in the light of our present experience, to carry the determination to radically remove all tissues affected by malignant tumors. Do results warrant the removal of organs and the invasion of the large cavities of the body? For the purpose of throwing some light upon this problem, let us consider briefly the accumulating experience in operations done for the removal of cancer of the rectum, the uterus, the larynx and the stomach.

Until within fifteen years extirpation<sup>8</sup> of the rectum had fallen into disrepute, both because of the great mortality which attended the operation and the recurrence of the disease after it. By no means all cases of rectal cancer are suitable for operation. For example: Cripps, in 400 cases, either selected or obtained consent to operate in but thirty-eight. Of this number three died as the result of operation, causing a mortality of 8 per cent., ten recurred within a year, five in one to three years, one died still later. In twelve there was no recurrence, and of these seven had outlived the period of three years. When recurrence was noticed it was found that the cancerous foci left behind grew more rapidly than did the primary tumor. In selecting cases for operation it is necessary to subject them to the most rigid examination, and this to be absolute should be done under anæsthesia. Only those are suitable for operation in whom the entire disease is removable. While an occasional case has been cured where the recto-vaginal septum has been invaded, the rule holds good that if the disease has extended beyond the limits of the bowel, be it in whatever direction it may, the case is usually inoperable. In making the examination the finger is of greater service than the speculum. Those presenting the most promising features do not involve the entire circumference of the rectum, are capable of being moved in various directions, up and down as well as laterally, and are located within a few inches of the anus. Allingham considers it unsurgical to attempt the extirpation of a cancer located four or five inches up the rectum.

There seems to be the greatest variance in the results obtained by operators. Stierlin collected 362 cases from whom the rectum had been extirpated. The mortality following operation in the hands of different operators ranged from 4 to 58 per cent. There is no doubt that the number of radical operations on the rectum is increasing with each year. Between the years 1886 and 1891 Czerny had presented to him eighty-two cases of rectal cancer, sixty-eight of whom he operated on by different methods. Roughly grouped, thirty-two were done by perineal methods, and among these there occurred one death. In thirty-six he resected the bones, and in these there were seven deaths. Of the

thirty-one surviving the perineal operations those not cured lived, upon an average, two years, while one patient lived four years. Ten, or about one-third of the entire number, recovered from the removal of the malignant tumor by the sacral route, nine died within six years, eighteen were alive at the time of report, six of whom had outlived the period of two years. These results, while not brilliant, justify, we must admit, the removal of rectal cancer by the knife.

As cancer attacks the uterus more frequently than any other part of the body it becomes a serious question as to how best to eradicate it, if this be at all possible. There is the greatest diversity of opinion among men of large observation and operative skill. Byrne, for example, has observed better results with the galvanic cautery than with hysterectomy, and regards the latter operation as unwarranted. He insists that the mortality therefrom is entirely out of proportion to the results it yields. W. H. Baker, referring recently to ten cases in which he removed the diseased mass by high amputation, reported by him in 1882, still finds one-half of them alive ten to twelve years after operation. In a second series of sixteen cases in which there occurred no death from operation ten had no return of the disease; one being well eight years, two seven, three six, three three years, and one two thereafter.

In England, hysterectomy is rarely performed, while with us and in Germany it is a growing operation. The mortality attending complete removal of the uterus, as reported by Fischel, in 175 cases amounted to 7.4 per cent., while in high amputation it was still greater, being 8.4 per cent. But aside from this, the most important point is that recurrence is much more frequent after partial than after complete removal. This was to be expected, for just as in the breast, malignant foci are found at points remote from the primary growth. For example, with cervical disease malignant invasion of the fundus may co-exist, not recognizable at the time of operation. There can be no certainty that the disease has been entirely removed when only a part of the organ is carried away. Muenchmeyer, presenting the report of eighty cases of hysterectomy, mostly vaginal, done

at the Dresden Clinic, between the years 1883 and 1890, informs us that four deaths resulted from the operation. Of the remaining seventy-six, fifty-nine, that is 36.2 per cent. had remained free longer than one year and 21.2 per cent. for a period greater than three years. In France, Terrier and Hartman state that 30 per cent. are permanently cured. Keith, after lamenting the fact that the number who are alarmed in the curable stage is few, reports twelve cases, with one death due to operation. Four died soon after from recurrence, and two at a more remote period for the same reason. The other five continued well, one four years and five months, another four years and two months, one two years, and the remaining two eighteen and eleven months respectively after operation. When we take into consideration the depleted condition of the women operated upon for uterine cancer, and the remote period at which operation is undertaken, we certainly can speak of operations upon suitable cases as being far from unpromising. I believe that could they obtain surgical relief in their early stage the results would be as satisfactory in this form of cancerous invasion as in any other. True, a careful selection of cases must be made. When the vaginal walls are implicated and the uterus is fixed because of the malignant infiltration into the surrounding structures, when the cervix has melted away, it is evident that no operation can be undertaken which will remove all existing foci of disease.

Cancer of the larynx presents a more hopeless condition. In all countries surgeons report successful cases after partial or complete laryngectomy. Gussenbauer's case, where the patient, even at seven and one-half years after operation, was not only well, but able, with the aid of an artificial larynx, to speak quite distinctly, is a well-known example of the successful issue. Yet, in estimating the probability of success of extirpation of the larynx, the occasional successful case is cheering, but not determining. Wasserman has gone into the literature of the subject most extensively. He reviewed the history of every case published up to 1890, and was not satisfied until he had in each instance studied the original publication. Following the plan of Scheier, he classified them under six heads. The first were cases who died within

fourteen days of operation ; second, those dying within six weeks ; third, those in which there was recurrence ; fourth, cases in whom death was caused by some intercurrent affection ; fifth, those discharged after too brief a period of observation ; and finally, those who were definitely cured. He furthermore subdivided them into two groups, those operated upon before 1881, and those since, for it was at this time that the subject was thoroughly discussed at the meeting of the International Medical Congress in London. Prior to this year the mortality of the operation of total extirpation of the larynx was 53 per cent., but with the newer technique established then, it was reduced in the subsequent operations to 23 per cent. Thirty-six per cent. of those recovering from the operation suffered recurrence.

Out of 121 cases of total extirpation, only eight outlived the three-year period of probation, thus yielding as the ratio of cures a percentage of 6.6. With partial operation, for some inexplicable reason, the mortality was even greater, being in the neighborhood of 28 per cent. This includes only the list of cases operated upon since 1881. Of the forty-five cases in this group the permanent recoveries were likewise 6.6 per cent. Not one of ten cases from whom the larynx was partially removed, prior to 1881, was permanently cured. It appears, then, without entering upon a study of the limitation of cancerous disease in the larynx to determine the ratio of intrinsic and extrinsic cases, that laryngectomy, either total or partial, presents anything but an encouraging record. I am almost inclined to say with Tauber, that the surgeon has three times as good an opportunity to kill the patient as has the disease.

But one word as to the operative treatment of gastric cancer. Pylorectomy has been in its outcome, perhaps, as unfortunate as has any surgical procedure for the relief of carcinoma. The many difficulties attending the early recognition of cancer of the stomach because of the obscurity of its symptoms, the rapid invasion into surrounding structures, the early occurrence of secondary disease, the existence of numerous adhesions—all combine to secure its performance at a period too late to be of service, and surround it with numerous difficulties. Gastro-enterostomy has been equally fatal, the mortality from operation alone being fully



50 per cent. The best that can be said for these operations is that they are yet in the experimental stage. It is to be hoped that with the newer methods of diagnosis in these affections, the early and certain recognition of cancer of the stomach may be brought within the realm of surgical relief.

As a general rule, it may be stated that heroic operations are not to be undertaken unless there is every prospect of effectually rooting out the disease, and provided that the procedure does not jeopardize the life of the patient. Antisepsis, however, has extended the field of operative relief for malignant tumors, and secured, after operation, greater certainty of prompt repair. Even in recurrent cases the surgeon is able, sometimes only after a series of attempts, to thoroughly eradicate the disease.

In conclusion, I may be permitted to reiterate that recent study of cancer only emphasizes its infectious character and primarily local origin. To effect its cure we must be able to reach beyond the infected area into healthy structure. To accomplish this with reasonable certainty the surgeon has but one agent, the knife.

# A STUDY OF SEVENTEEN CASES OF EMPYEMA.

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INASMUCH as the rational therapy of empyema belongs to the realm of surgery, empyema may be regarded as essentially a surgical disease. It is not the intent of this paper to discuss the pathology, the symptomatology or the treatment of the disease, but to present a series of cases, and deduce from them whatever lessons they may teach.

These cases occurred in the services of Drs. Pilcher and Fowler, in the Methodist Episcopal Hospital, in Brooklyn. The very brief histories herewith given are abstracted from the more elaborate histories in the archives of the hospital. The common symptoms of empyema presented by the cases, either before or after the operation, are not given unless they have some special feature. In all cases, the operations were conducted as aseptically as though a fresh wound were to be made in normal tissue. The operators were not influenced by the mistaken idea that "pus is pus," but took the precautions which modern surgery has at command to prevent the nocuous infection of innocuous pus. In the cases subjected to operation, it was the custom to strip of its periosteum and vessels the portion of rib to be resected and remove only the bone. In order to prevent the danger of collapse in feeble patients, the rapidity of the escape of pus was lessened by introducing the finger into the wound, or by placing some obstruction at the surface. Drainage tubes were introduced in all cases. Usually two fenestrated rubber tubes were used. Irrigation of the cavity with warm aseptic, or antiseptic solution was practiced. For this purpose boro-salicylic, hydro-naphthol, normal salt solution or distilled water was employed. None but sterilized dressings were used. After the operation, as the lung expanded, and the amount of discharge became less, the tubes

were shortened from time to time, and were usually discarded about the fourth week. The frequency of dressing was governed by the amount of discharge. During the first week it was usually necessary to change the dressings every day. Irrigation was practiced at the dressings when the discharge was septic in character. The cases were placed on tonic treatment, and the pain and cough of irritation were combatted with appropriate remedies. These features, common to all of the cases, are omitted from the brief histories below, unless they present some peculiarity.

CASE I.—Female, forty-two years. Six weeks prior to admission to the hospital the patient developed an idiopathic pleurisy of the left chest. The active symptoms subsided, but she continued to lose flesh and strength, and was admitted in a much reduced condition. Physical examination showed fluid filling the lower half of the left pleural sac. Pus was obtained by introducing a needle in the eighth space in the mammary line. On the third day after admission she began to expectorate large quantities of purulent matter, and presented the physical signs of rupture of pleural pus into the lung.

*Operation.*—Three inch incision over sixth rib. One and one-half inches of rib excised in axillary line. Pleura opened and a large amount of greenish pus evacuated. At the same time a considerable quantity of purulent fluid escaped from the mouth.

During the four weeks subsequent to the operation the discharge from the wound, which for the first few days was profuse, gradually became less. The wound was irrigated daily through the tube. The lung expanded well. The expectoration, which immediately after the operation was composed of bloody pus, entirely subsided. Aside from a slight, irritable cough, and occasional pain at the site of the wound, the patient was well when she was dismissed, two months after admission.

Before the operation the temperature fluctuated between  $99^{\circ}$  and  $102.5^{\circ}$ . The pulse rate had gradually increased up to 135. Respiration was 30–35. After the operation the temperature fell to normal. For twenty-four days the evening temperature continued to rise slightly above normal. It then subsided. The pulse rate gradually sank to normal. Respiration remained at 38 for three days subsequent to the operation, and then steadily decreased.

CASE II.—Male, eleven years. A delicate child. Acute symptoms three years before admission. Symptoms of pleuritis with

effusion were followed by symptoms of empyema of the right chest, with perforation into the lung. For two years the patient had been coughing up large quantities of pus. His general condition became much worse. A fluctuating tumor finally appeared directly under the right nipple, which increased in size until it reached three inches in diameter.

*Operation.*—The tumor was incised and pus and necrotic debris were evacuated. No opening into the pleural cavity was discovered. A section of bone was removed from the subjacent rib.

The pleura was found greatly thickened. There was so little evidence of fluid within the pleural cavity that the pleura was not opened.

After the operation, during the attacks of coughing, air passed in and out through the wound. A considerable discharge of pus persisted.

Aspirating needle introduced in sixth space discovered no pus. Pus obtained in seventh space in the axillary line. Section of seventh rib excised. Pleura opened and considerable pus liberated. The pleura was very dense and thick. For ten days following the operation there was a copious discharge. The patient's general condition improved very much after the second operation. Both wounds healed firmly.

After the first operation the temperature, pulse and respiration rates continued above normal; after the second operation they gradually subsided.

At the present time, three and one-half years after the operation, the patient enjoys good health, and has no symptoms referable to the chest. He has a right concave scoliosis of so marked a degree as to produce a very noticeable deformity. The right chest in its lower part is bound down and contracted, and the left chest has undergone compensatory enlargement. The scoliosis is most marked in the upper dorsal segment.

CASE III.—Male, eight years. Empyema of left chest subsequent to pneumonia two years before admission to hospital. Tumor appeared below nipple, was incised and pus evacuated. At the time of admission, eighteen months later, this was still a discharging sinus. Patient was much emaciated.

*Operation.*—Incision in axillary line exposing fourth, fifth, sixth and seventh ribs. One and one-half inches of each rib resected. Pleura opened at site of sixth rib. A large amount of foul-smelling pus evacuated.

An abundant discharge of pus continued after the operation, necessitating frequent dressings. After the fourth day irrigation of the cavity with tincture iodi 1 : 250 was begun. The amount of discharge steadily decreased, the lung expanded, and the cavity contracted and closed. The patient's general condition was much improved. He became robust and felt perfectly well.

After operation the temperature sank to subnormal, and then gradually ascended.

CASE IV.—Male, twenty-one years. An advanced case of phthisis admitted to the surgical service from the medical service with the diagnosis of pyopneumothorax following the rupture of a tuberculous cavity through the pleura. The pus dullness had steadily increased till it occupied the lower half of the left pleural cavity. The lung lesion was very pronounced and the patient was *in extremis*. Respiration 30 to 40; chloroform was administered, and at the time when surgical anæsthesia was reached respiration ceased, and heart failure followed in a few seconds. Faradism and artificial respiration were of no avail. The autopsy showed a large amount of pus in the pleural cavity and extensive tuberculous destruction of the lungs.

CASE V.—Female, forty-four years. In childhood patient suffered with tubercular coxitis and spondylitis, resulting in a marked kyphosis. Nine months before admission she developed pleurisy on the right side, with effusion, following pneumonia. This soon became an empyema, and patient became greatly prostrated. Aspiration showed pus.

*Operation.*—Incision in axillary line parallel over eighth rib. Two inches of rib removed. Exploring needle found pus, and the incision was continued through the pleura. About one pint of thin pus escaped. Irrigated with normal salt solution.

The discharge, which at first was profuse and offensive, gradually became less, and the patient's general condition steadily improved. Three weeks after the operation the discharge had practically ceased, and the patient was dismissed.

Before the operation the temperature ran along at 99°. After the operation it steadily rose, reaching its maximum, 101°, on the third day. From this it subsided to normal.

At the present time, thirteen months after operation, the patient is well and strong, and has no chest symptoms, excepting an occasional pain on the affected side.

CASE VI.—Male, sixty-three years. Patient was operated upon

for papilloma of the bladder, and while still in the hospital developed double idiopathic pleurisy with effusion. Resolution took place on the right side, but the left became an empyema. Sixty-eight ounces of thin pus were drawn off with the aspirator. Five days later a resection of two inches of the eighth and ninth ribs was done, and a considerable amount of pus liberated. Seven weeks after the operation the wound was perfectly dry. The temperature sank after the aspiration and after the rib resection. On account of wounds elsewhere, its curves can not be attributed alone to the empyema.

The above cases occurred in the service of Dr. Fowler; the following are from the service of Dr. Pilcher.

CASE VII.—Male, thirty-two years. This case was brought to the hospital *in extremis*. Physical examination showed fluid in the left pleural cavity, and advanced tubercular disease in both lungs. His condition was so low that operation was not deemed advisable. The left pleural cavity was aspirated, and four ounces of pus drawn off. The patient continued to sink, and in the course of twenty-four hours died.

CASE VIII.—Female, ten years. Patient was admitted with double empyema of idiopathic origin. Pulse rapid and feeble; breathing rapid and insufficient; face cyanotic.

*Operation*.—Two inches of eighth right rib removed at the angle. Pleura opened, and a large amount of pus containing cheesy, inspissated matter was liberated.

The operation was followed by marked prostration.

Seven days later, when the patient had rallied, a second operation was done on the left side. Two inches of eighth rib were excised at the angle. Eight ounces of pus and cheesy material were liberated from the pleural cavity. Irrigated with distilled water.

After each of the operations the patients suffered much pain and exacerbations of coughing. Her general condition was better after the second than after the first operation. The pleurae were irrigated daily. Tubes were removed on the seventeenth day after the respective operations. Convalescence was rapid. Eight weeks after admission both wounds were solidly healed.

After the operations, the temperature and pulse rate were lowered, but continued up to the time of her discharge slightly above normal. The respiration rate, which after the first operation was 70–80, gradually decreased to 30.

At the present time, eighteen months after her discharge from the hospital, the patient is a robust, healthy child. At the seat of the right cicatrix is a depression slightly more than 1 cm. deep. The respiratory murmur over the scar is normal. Below the seat of operation the pulmonary resonance is dull, and the breathing sounds are very faint. On the left side the resonance below the scar is slightly dull; respiratory murmur normal. There are no symptoms referable to the chest, excepting an occasional slight irritable cough. She takes a full breath without producing pain or râles. A slight tendency to habitual dorso-lumbar kyphosis has developed since the operation.

CASE IX.—Female, five years. After a pneumonia, three months before admission to the hospital, a pleural effusion developed in the left chest, which was continuous with the subsequent objective and subjective symptoms of empyema. On admission there was a very perceptible bulging of the intercostal spaces on the left side. Pus was discovered with the aspirating needle in the eighth interspace.

*Operation.*—One and one-half inches of ninth rib removed just posterior to posterior axillary line. Thick, yellow pus liberated from pleural cavity. Three large drainage tubes introduced. The lung gradually expanded, and the case went on to complete closure of the sinus.

After the operation the temperature and pulse rate diminished. The respiration rate increased slightly—from 35 to 37–40.

At the present time, seventeen months after the operation, the patient has no symptoms referable to the thorax, excepting an occasional neuralgic-like pain following exposure to cold. There has developed since the operation a slight right convex dorsal scoliosis. The respiratory murmur and pulmonary resonance over the seat of operation are normal.

CASE X.—Male, forty-four years. This patient had previously been a healthy man. Three months prior to admission to hospital, among other symptoms, he developed violent epigastric pain and vomiting. He was unable to swallow solid food. Four weeks later pain developed in the lower part of the right chest, which he interpreted as pleurisy; and in the course of three weeks more he began to experience more pain about the free border of the ribs. He became much prostrated.

At the time of his admission to the hospital he presented the symptoms of an empyema of the right chest, extending up to the

fourth rib. The aspirating needle introduced in the seventh space discovered pus.

*Operation.*—One and one-half inches of the rib, just anterior to angle, removed. Two quarts of greenish, foul-smelling pus, containing necrotic debris and jelly-like material, evacuated. While the fluid was escaping from the wound the patient collapsed, and required vigorous stimulation. The diaphragm was found perforated, and a large abscess cavity in the liver. Active stimulation was continued, but patient steadily sank and died in fourteen hours.

CASE XI.—Female, twenty-four years. History of pneumonia ten years before admission to hospital. Five weeks prior to admission the symptoms which terminated in empyema began. At the end of four weeks an opening spontaneously occurred in the left chest wall in the sixth interspace in the nipple line, and discharged some pus. On admission a considerable current of air passed in and out through this opening with the respiratory movements. The patient was feeble and emaciated. Delirious at times. Feet and legs œdematous. Bed sore on left hip. Physical examination discovered signs of bronchial fistula.

*Operation.*—Cocaine M 30, 4 per cent. solution. One inch of ninth rib resected. Pleura opened and pus liberated. Not irrigated. On the following day the patient's condition was very low. The discharge from the wound was profuse. On the third day after the operation she died. Autopsy showed miliary tuberculosis. Nearly the whole of left lung was involved, and the right was completely consolidated.

CASE XII.—Female, thirteen years. Two years prior to admission to hospital an abscess of empyemic origin spontaneously ruptured in the right lumbar region. The sinus continued to discharge.

*Operation.*—One inch of tenth rib excised just anterior to angle. Pus discovered in pleural cavity. Old sinus curetted. Tubes introduced through both openings. Subsequent treatment with hydrogen peroxide and iodoform emulsion resulted in a complete cessation of the discharge and a closing of the sinuses. At the end of six weeks the patient was discharged cured.

At the time of operation the temperature was normal. After the operation it arose to 100° F. and then gradually subsided.

Until a week ago, which was seven months after the operation, the patient had been well and strong. She had steadily improved



since leaving the hospital, and the wounds remained solidly closed. One week ago the original sinus spontaneously reopened and a small amount of pus escaped.

CASE XIII.—Female, twenty-five years. Six months prior to admission to hospital patient developed a septic condition following child-birth. This was in turn followed by purulent pleuritis. Three months later a tumor appeared in the right sixth intercostal space, a little external to the nipple line. This was incised, and a sinus persisted.

*Operation.*—Sinus curetted. Section of ninth rib removed in axillary line. Large quantity of foul, thick pus escaped. Irrigated, and scraped with a blunt spoon.

Two weeks after operation patient was absent from hospital for several days. Soon after this the wound closed and the febrile evidences of retention appeared. The wound was reopened and a considerable amount of retained pus was liberated. Under treatment with hydrogen peroxide and 10 per cent. iodoform emulsion, the secretion diminished. At the end of three months the patient was dismissed from the hospital with her general condition very greatly improved, but with a small and gradually closing abscess cavity.

Before operation the temperature ranged from normal, to  $101^{\circ}$ ; pulse, 120–160; respiration, 25–30. At the time of her discharge from the hospital the temperature and pulse rate were normal and respiration was 20–25.

Since her discharge the sinus has closed on three occasions, and been reopened. A bronchial fistula was present, as evidenced by the fact that medication introduced into the wound was coughed up and spat out. At the present time the wound has been solidly closed for five weeks.

CASE XIV.—Female, thirty years. A bullet from a pistol entered the patient's back, piercing the left sixth rib two and one-half inches from the spine, and lodged under the skin at the upper side of the left breast. Four weeks after the injury the expectoration, which had previously been bloody, began to show traces of pus, and the patient presented the symptoms of empyema. One week later one and one-half inches of the ninth rib in the posterior axillary line were excised. A large amount of foul-smelling, bloody pus was evacuated from the pleural cavity. The finger introduced discovered free spicules of bone lying in the bottom of the pleural sac. The foreign matter was removed and two large drainage tubes inserted. The after-treatment

of the wound was the same as in the other cases of empyema. Later on, hydrogen peroxide and iodoform emulsion were employed, and ultimate sound healing of the wounds was secured.

Before the operation the temperature was irregular, ranging from normal to  $103.6^{\circ}$ . At the time of operation it had been steadily going down, and had reached normal. After the operation it gradually arose, reaching its maximum,  $104.2^{\circ}$ , on the tenth day. From this it steadily declined to normal.

CASE XV.—Male, nine years. Acute idiopathic pleuritis, four weeks before admission, resulted in empyema of the right chest. The patient became greatly emaciated and prostrated.

*Operation.*—One and one-half inches of ninth rib removed in the posterior axillary line. A large amount of pus and thick, flocculent material evacuated. The lung was found retracted beyond the reach of the index finger. The tube was removed on the tenth day. The lung expanded well. The general condition of the patient rapidly improved, and at the end of five weeks the wound was perfectly healed and dry.

After the operation the temperature, respiration and pulse rates steadily diminished.

CASE XVI.—Male, thirty-seven years. Admitted greatly prostrated with advanced chronic phthisis, and empyema due to rupture of a tuberculous cavity into the left pleural sac. The resection of a portion of rib was done in the axillary line. Pus and necrotic debris were evacuated. The patient continued to sink, and survived the operation but four days.

CASE XVII.—Male, twenty years. Acute symptoms began three weeks previous to admission to hospital, when patient developed a pneumonic process in the left lung, with gangrene of pulmonary tissue. He coughed up fetid matter and presented the physical signs of cavity in the lung. Admitted to hospital with pyopneumothorax. One inch of ninth rib resected and a large amount of stinking pus liberated. At the end of a week he was greatly improved. On the tenth day the symptoms of pneumonia in the previously sound lung developed, which terminated fatally at the end of six days. Autopsy showed large cavity in left lung and pneumonic consolidation in lower lobe of right.

After the operation the temperature declined gradually from  $103^{\circ}$  to normal, and then as the complication in the other lung developed, it rapidly rose until the end,

Of these seventeen cases six were of idiopathic origin; four followed pneumonia; four were preceded by pulmonary tuberculosis; one was associated with puerperal septicaemia; one followed the rupture of an abscess of the liver through the diaphragm; and one was traumatic in origin. In one of the idiopathic cases both sides were involved.

The four cases, IV, VII, XI and XVI, which were complicated with tuberculosis, all terminated fatally. Case IV, in which a tuberculous cavity in the lung had ruptured through the pleura, and given rise to pyopneumothorax, died during the anaesthetization. Case XVI, of the same character, survived the operation four days. Case XI, in which had spontaneously developed a sinus through the chest wall, and a bronchial fistula, died on the third day after the operation. And Case VII expired within twenty-four hours after admission, four ounces of pus having been aspirated from the chest. These four cases presented advanced tubercular disease of both lungs. Of the two remaining fatal cases, X and XVII, the first, which had for its aetiology the rupture of a liver abscess into the pleural sac, died a few hours after the operation for empyema; and the second perished from a complicating pneumonia in the previously sound lung.

The ages of the cases of idiopathic origin were respectively nine, ten, eleven, thirteen, forty-two and sixty-three. Those following pneumonia were five, eight, twenty and forty-four. The cases associated with pulmonary tuberculosis were twenty-one, twenty-four, thirty-two and thirty-seven.

Of the cases of single empyema not traumatic in origin six involved the left side, and nine involved the right side.

Spontaneous evacuation occurred in four cases into the lung; in one case through the chest wall; and in one in the lumbar region. Three more cases presented a single, thin-walled, fluctuating tumor of the chest, which, in the course of time, would have spontaneously ruptured.

In Cases I, II, VI, VIII, IX, XIII and XV the temperature gradually subsided after the operation. In Case V, in which the pus was foul smelling, the temperature, which at the time of operation was  $99^{\circ}$ , gradually rose for three days after the oper-

ation, and then subsided. Case XIV, from which foul-smelling pus was evacuated, had a normal temperature at the time of operation, which, after the evacuation of the pus, steadily rose to  $104.2^{\circ}$ , and then subsided to normal. The temperature in Case XII, which previous to the operation was normal, gradually rose after the operation and then subsided.

In the majority of cases the respiration rate decreased after the operation. In Cases I and IX it increased for several days after the evacuation of the pus, and then diminished.

Of the fifteen cases subjected to operation it is now known that nine are cured; one, which cannot be communicated with, is probably cured; and one, though greatly improved, has recently had a recurrence of the discharge from the old sinus. Six cases died: four with operation, and two without operation.

Habitual spinal curvatures, of a greater or lesser degree, have been observed in the cases of the younger patients.

What may we conclude from a study of these foregoing cases? It is to be regretted that the fluids were not subjected to bacteriological examination. Inasmuch as this is the case, an opinion as to their aetiology has little scientific value. This is especially true of the so-called idiopathic cases. In all probability the tubercular cases, IV, XI and XVI, in one of which was a sinus through the chest wall, and a bronchial fistula, and in the other two, perforated tuberculous cavities, contained, besides the tubercle bacillus, the pyogenic staphylococci and streptococci. These two last cases cannot be regarded as tubercular pleurisy at all, but as a violent septic pleuritis, due to infection from an abscess cavity, with its numerous varieties of pyogenic micro-organisms.

The four tubercular cases tend to corroborate the lesson which many surgeons urge, that pulmonary tuberculosis, complicating an empyema, constitutes a contra-indication to operative interference. In all of these cases, the empyema developed only when the tuberculous destruction of pulmonary tissue had reached a very advanced stage. The patients were already affected by a disease which, had the empyema not occurred, would, in itself, almost certainly have led to a fatal issue.

Whether the cases following pneumonia had for their aetiological factor the pneumococcus must always remain a question.

The aetiology of Case X has some obscure points ; and the question may be ventured as to which was the primary lesion—the empyema or the abscess of the liver? The pain, which the patient referred to the free border of the ribs over the liver, was possibly due to an adhesive peritonitis between the upper surface of the liver and the diaphragm, followed by the perforation. The fact that this pain was preceded by the subjective symptoms of pleurisy might point to a lesion primarily of the pleura. On the other hand the pronounced gastric symptoms which marked the onset of the trouble, with the pain about the liver, and the œsophageal stenosis, speak more for the primary lesion of that organ ; and it is most probable that the pain, which was subjectively interpreted as pleuritis, was a diaphragmatic peritonitis, which preceded the perforation of a liver abscess into the pleural cavity.

Although spontaneous evacuation occurred in six of the seventeen cases, leaving out of account those caused by perforation of tuberculous cavities into the pleura, the opening was external in only two ; and neither of these was in the most favorable location. From the experience with these cases, it may be deduced that it is unwise and dangerous to allow an empyema to pursue its natural course with the hope of a spontaneous cure being effected, when an operation, which, in itself, is attended with far less danger than the natural course of the disease, can be performed.

Why certain cases, from some of which foul-smelling and evidently septic pus was evacuated, developed higher temperatures after the evacuation of the pus than they had presented before the operation, can be accounted for in one or more of the following ways: The low temperature before the operation may have been because, (1) the pus was contained in a cavity inclosed by a thickened wall, covered with fibrinous deposit, rendering its surface incapable of readily absorbing septic material ; (2) the tension upon the walls of the pus cavity so impeded the blood and lymphatic circulation that absorption was, to a greater or lesser degree, hindered ; (3) the patient may have gradually become immune to the action of the ptomaines, which for a long time were constantly being absorbed in small quantities ; (4) the pus may not have

been a septic pus. The subsequent rise of temperature may have been due to the fact that (1) the operation wound and the breaking up of adhesions within the pleural cavity opened chinks and channels for the admission into the connective tissue spaces of the thorax of septic material which had been previously enclosed by non-absorbing surfaces; (2) infection from without may have occurred at the time of operation; (3) the febrile movement may have been simply the fever of irritation so often observed after operation or injury; (4) it may have been due to constitutional causes other than the empyema.

The fact that the younger patients show so marked a tendency after operation to habitual spinal curvatures, demands more than a passing notice. There is in these cases the inevitable tendency to flex the dorsal vertebræ toward the diseased side. It arises from the greater comfort which is gained by the position, and the natural tendency of the chest, emptied of a part of its contents, to collapse. The patient finds that this position immobilizes, to a certain degree, the tissues about the wound, and diminishes the painful friction of the opposed pleural surfaces. This, in connection with the collapse of the diseased chest, and the compensatory emphysema of the sound lung, tends to throw the spinal column in lateral flexion toward the affected side. Anatomically the deformity is not so much due to muscular atrophy as to the intra-thoracic adhesions and the ligamentous and fibrous changes in the walls of the thorax, which occur in parts fixed for a considerable period of time in one position. The muscular degeneration is secondary to these changes. It therefore commends itself, that an effort be made soon after the operation to prevent this sequel. Let the spinal column be immobilized by some mechanical means, as a light plaster-of-Paris jacket; and, either immediately or as the diseased lung expands, let the tendency to deformity be gradually corrected, until finally the convexity of an artificial scoliosis is made to look toward the diseased side. The spine may be retained in this over-corrected position until the lung has fully expanded, and the danger of an habitual spinal curvature is passed. When the wound has become permanently healed, such gymnastic exercises and massage as shall develop the diseased chest should be inaugurated.

# REMARKS ON THE MANAGEMENT OF SUPPURATION, COMPLICATING TUBERCULOUS DISEASE OF THE BONES AND JOINTS.<sup>1</sup>

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THE tubercular process does not ordinarily produce true supuration, but infection with the microbes of suppuration not infrequently complicates the original condition. The tubercular process, however, often results in the formation of a tubercular or cold abscess, which contains a fluid until recently called pus, but consisting in an emulsion of shreds of tissue and of fatty and granular detritus, the degenerated products of tubercular granulation.

I must, however, omit here all discussion of the pathology, clinical history and classification of tubercular abscess, and ask your attention to but one point in their management, that which I consider the most important when the abscess is symptomatic of joint disease, namely, the correct treatment of the focal tuberculosis, upon which the abscess primarily depends.

The day is past when the surgical conscience could be satisfied with the use of any means whatever directed to such an abscess alone. The adoption of strict local rest, with general hygiene, has placed tubercular joint disease among the most curable of the graver surgical affections, and we now have means approaching precision, whereby strict physiological rest may be secured for the spine and larger joints for any desired length of time, and without the necessity for long periods of confinement to the bed or house. It is not necessary to state here what those means are; the point which I wish to emphasize is that the more promptly, thoroughly and intelligently they are employed the fewer abscesses will develop in these cases and the simpler will their special treatment require to be, for if the primary cause is

<sup>1</sup> Read before the Medical Society of the State of New York, February 8, 1893.

met at its source, the results of local interference are utterly different from corresponding results when the primary focus of disease is neglected.

The above principles, so far as they apply to Pott's disease, were clearly recognized and expressed in a paper on the "Mechanical Treatment of Angular Curvature," read before this society in 1863, at its fifty-sixth annual meeting, by Dr. C. Fayette Taylor. In a paper by the same author on the "Management of Lumbar and Psoas Abscess," published in the *Medical Gazette* January 1, 1870, the following expressions occur :

"The first step in the treatment of lumbar or psoas abscess is to treat their cause in the spinal column. The abscess is but a symptom after all. It is idle to address our treatment to a mere symptom without first applying the appropriate remedy to the source of the trouble."

And again :

"So long as the disease in the spine, where the abscess has its origin, is not attended to, it were idle to talk of a treatment for one of its symptoms or effects. In regard to the preventing of abscess by relieving the disease in the bodies of the vertebræ, I am able to speak with emphasis. On examining our records I find that out of 183 private cases there were but three cases of abscess occurring after treatment for disease of the spine had commenced."

He continues :

"My second proposition in regard to lumbar and psoas abscess is to watch them carefully, and if they increase to any considerable size, or if they occur near or in contact with bone, with thin layer of soft tissue over it, or if they remain stationary and do not rapidly recede, then to promptly open them by a free incision with the curved bistoury."

"And here I come to my third proposition, which is this : The chief danger of a lumbar or psoas abscess arises—all other things being equal—from the neglect of it rather than from the fact of it."

He extends the principle in the following words from the same paper :



“Of course, in hip-joint disease, as in disease of the spine, the primary idea is first to relieve pressure in the joint before treating the abscess,” and in his monograph on the “Mechanical Treatment of Diseases of the Hip-joint,” published in 1873, he says: “In regard to abscesses, in incipient cases promptly and carefully treated by this method [counter-extension] they are unknown. In later cases the presence of a recent abscess, if promptly evacuated, does not necessarily prevent a complete restoration of the joint.”

He recommended (1870) the following plan of treatment :

“Prompt evacuation of the contents of an abscess on its first appearance by a free incision in the most dependent part, so as to secure complete egress of the fluid ; firm and persistent pressure over the cavity, greatest at the circumference, and allowing the opening to be free ; a few days of quiet of the patient, and increased vigilance in protecting the spinal column ; this for the past five years has been my practice in the management of lumbar and psoas abscess.”<sup>1</sup>

He applied the same principle to the treatment of hip abscesses as described in his work on the hip (1873). This principle, which recognizes the paramount importance of treatment of the primary disease, has not been overlooked by recent writers. In the article Potts' Disease, in “Keating's Cyclopædia of the Diseases of Children” (1890), Dr. A. Sydney Roberts says that :

“Clinical experience has taught orthopædic surgeons that the course, progress and treatment of cold abscesses connected with Pott's disease are materially affected by mechanical treatment. When good support of the diseased parts is given, we are sure that the development of abscesses is less common, and in many instances they are entirely absorbed. Abscesses of this nature should not be opened too early, and when opened it is well to do so in a position suitable for drainage, and under rigid antisepsis.”

In the “American Text-book of Surgery (1892),” edited by Drs. Keen and White, the following words are found in Chapter VII, on surgery of the joints (p. 378) :

“Accumulations of fluid, either intra- or extra-articular, may very properly be removed by aspiration, provided a thoroughly

<sup>1</sup> Medical Gazette, January 1, 1870.

aseptic needle is used, but in the ordinary cold abscesses, consequent upon joint inflammation, if the disease is thoroughly treated, the abscesses may safely be left to take care of themselves."

In the "Transactions of the American Orthopædic Association" for 1891 (Vol. iv), is an interesting series of papers on the abscesses of Pott's disease, where many of the writers insist on the primary importance of spinal protection. Dr. W. R. Townsend says :

"In all cases, no matter at what stage of the disease, efficient protection should be given to the spine."<sup>1</sup>

Dr. N. M. Shaffer says :

"My experience is that tubercular abscesses in Pott's disease, as well as in the abscesses of the chronic tubercular lesions of the major articulations, pursue a benign course under efficient mechanical protection to the diseased articulation, and that we too often resort to the knife."<sup>2</sup>

Dr. H. L. Burrell remarks that :

"Efficient mechanical support of the spine will in a great many cases unquestionably avoid the necessity for operative interference."<sup>3</sup>

And again :

"Efficient mechanical support is the prime factor in the treatment of caries of the spine associated with abscess."<sup>4</sup>

Mr. G. A. Wright gives as his first conclusion from a study of these cases that :

"The first essential is rest, in its surgical sense, to the spine."<sup>5</sup>

Dr. R. W. Lovett, in his "Fisk Prize Dissertation on Diseases of the Hip-joint (1892)," gives some interesting statistics bearing on the point under discussion. In 574 new patients affected with hip disease treated from 1884 to 1890, inclusive, 107 abscesses

<sup>1</sup> Trans. Am. Orthop. Asso., Vol. iv, p. 168.

<sup>2</sup> Op. cit., p. 180.

<sup>3</sup> Op. cit., p. 100.

<sup>4</sup> Op. cit., p. 164.

<sup>5</sup> Op. cit., p. 173.

were opened, or in 18.7 per cent. of the cases treated, the practice being to admit to the hospital and open practically every abscess. He remarks as follows (p. 118):

“The reason for this small percentage is believed by the writer to be due to the fact that cases under ambulatory treatment are at once admitted to the hospital whenever sensitiveness or deformity of the joint occurs, and are treated by recumbency. In three years (1888-90) the percentage of cases admitted for deformity and sensitiveness has steadily increased, and the percentage of cases admitted for abscess has steadily diminished.”

He found that over one-half of the abscesses of hip-disease occurred in the first year of the disease. His statistics may be compared with those of the London Clinical Society's Committee, who reported in 1880 that of 401 cases of hip-disease, 69 per cent. developed abscesses, while Mr. Howard Marsh, in the same year, found 50 per cent. at the Alexandria Hospital, which diminution he attributed to “improved methods of treatment” (of the joint disease).

Dr. Gibney's series of 80 cases of spontaneously cured hip-disease, with 48, or 60 per cent. of abscesses, reported in 1878, may be compared with Dr. C. Fayette Taylor's report (in 1879) of 94 cases treated by thorough counter-extension, and followed to the end, among whom were 24, or less than 26 per cent. with abscesses, “nearly all in that condition when first applying.”<sup>1</sup>

It will be noticed in the foregoing extracts that while all are agreed as to the necessity for physiological rest secured to the diseased articulation by mechanical means, opinions differ as to what special treatment the abscess itself should receive. My own conviction, based on experience and study, is that while such local treatment is important, it is vastly less so than the proper management of the original trouble, and that when this is secured a variety of plans as to the management of the abscess itself are admissible.

If we have an acute, hot abscess, in other words true sup-puration, early evacuation is called for, and the employment of

<sup>1</sup> Boston Med. and Surg. Jour., March 6, 1879, p. 324.

means proper to render the cavity aseptic. In addition to the usual solutions, peroxide of hydrogen has proved itself a wonderful pus killer.

In the care of cold abscesses, my own preference in most cases is to open them so soon as they are easily accessible, using compression, and drainage if necessary. I have a high opinion of iodoform as a tuberculocide, and a rather poor opinion of the aspirator, as it is easily clogged by detritus. Each case should be studied and judged on its merits, my contention being that the thorough employment of positive, enforced rest and attention to general and local hygiene, will not only render severe operative procedures unnecessary in the majority of cases, but give a certain latitude in the choice of plans of managing the abscess, since any rational plan will give favorable results in the majority of cases.

Let us have no prejudice against radical operations when there is likely to be a definite advantage gained, but let us remember, First: That even comparatively simple operations are not free from danger. Bradford and Lovett report a case of death<sup>1</sup> in a child after washing out a small abscess cavity with 1:40 carbolic, and deaths from iodoform poisoning have not been rare. A death<sup>2</sup> thirty-six hours after incision and drainage, from suppression of urine, and one<sup>3</sup> from shock after curetting, have been reported. Second: Operative procedures do not prevent the occurrence of amyloid degeneration<sup>4</sup> nor of tubercular meningitis. Townsend reports two cases of death from tubercular meningitis following aspiration,<sup>5</sup> and Lovett one, ten days after incision and curetting.<sup>1</sup> Third: The majority of spinal abscesses, at least, become infected sooner or later after operation. Townsend reports that of fourteen operations consisting of incision, scraping and the use of iodoform emulsion or peroxide of hydrogen, eleven became infected at the time of operation or

<sup>1</sup> Bradford and Lovett, *Orthopedic Surgery*, 1890, p. 326.

<sup>2</sup> *The Treatment of the Abscesses of Pott's Disease*, Trans. Am. Orthop. Assoc., Vol. IV, 1891.

<sup>3</sup> Pollard and Marshall, *Lancet*, July 30, 1892, p. 259.

<sup>4</sup> Lovett and Goldthwait, Trans. Am. Orthop. Assoc., Vol. II, pp. 89 and 87.

<sup>5</sup> Trans. Am. Orthop. Assoc., Vol. IV, p. 170 and 169.

subsequent dressing.<sup>2</sup> Senn, in his recent work on "Tuberculosis of the Bones and Joints" (1892), says that in spinal abscesses he has only twice been able to maintain asepsis, the remaining cases became infected sooner or later, "and profuse suppuration set in with all the immediate and remote consequences" (p. 377). Fourth: Healing is often slow, and relapse frequent after operation.

Mr. G. A. Wright considers Barker's operation of incision, evacuation and scraping the best in spinal abscess, but remarks that it has failed in most of his cases.<sup>1</sup> Of thirty-seven resections recently reported by Drs. Pollard and Marshall, five died before the wounds had healed. Of the thirty-two who recovered, twenty-six relapsed and underwent from one to five secondary operations; of these they remark that "recurrences of disease appear to occur frequently whatever method of treatment be adopted."<sup>2</sup>

Of sixty-three operated cases of hip abscess reported by Lovett,<sup>3</sup> only one healed within six months of the operation.

There is no question that many of these operative procedures are justifiable, and some clearly indicated, but the more thoroughly strict mechanical protection to the diseased joint is used, the less will be the danger and the more favorable the result of rational operative interference, and the less the necessity for the severer operations.

<sup>1</sup> Trans. Am. Orthop. Assoc., Vol. IV, p. 173.

<sup>2</sup> Lancet, August 6, 1892, p. 303.

<sup>3</sup> Trans. Am. Orthop. Assoc., Vol. II, p. 88.

## TUBERCULOUS EPIDIDYMITIS.<sup>1</sup>

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IT is well known that tuberculous deposits are most frequently found in the epididymis, and less often in the substance of the gland, and then most abundantly in the neighborhood of the rete testis, while syphilitic gummata are deposited in the interstitial tissue between the seminal tubes. The disease generally commences as a deposit of gray miliary tubercle in the lymphoid intertubular tissue just as tuberculosis commences anywhere else, in glands, bones, joints, etc. "Wherever tubercle bacilli lodge they act as a specific irritant, which produces granulation tissue of a well-known type" (Park), which gradually replaces the normal tissue, is of low vitality, and breaks down easily, forming an abscess either primarily or by secondary mixed infection. The source of the infection is, undoubtedly, the lymphatic glandular system, particularly the bronchial glands; here the tuberculous bacilli first become arrested and filtered, passing during time through the whole chain of glands, and lastly into the lymphatic and circulatory system, disseminating the bacilli everywhere in the form of acute miliary tuberculosis.

In the testis and epididymis this process is essentially the same. An accumulation of low-formed cellular matter distends the tissues, presses upon the vessels and through inflammation involves the skin (Treves). The neighboring lymphatics become involved, catarrh of vas deferens results, the testis may become affected through its mediastinum, and deposits here secondarily perforate into the sometimes partly obliterated tunica vaginalis, producing a tuberculous pyocoele. The disease may extend up the vas deferens to the vesiculæ seminales, produce tuberculous

<sup>1</sup> Read before the New York State Medical Society in Albany, February 8, 1893.

prostatitis, cystitis, nephritis and peritonitis, either of which is necessarily fatal.

But what I particularly wish to emphasize is that the disease in the majority of cases commences as a local focus in one or both epididymes, and from there gradually extends into the testis itself and upward, finally affecting the whole genito-urinary apparatus.

The affection is said to be rare in infancy, but common between fifteen and thirty-five years; there probably must be a predisposition present, or rather a latent tuberculosis somewhere, and a blow or slight injury may furnish the exciting cause.

Karewsky has seen tuberculosis of the testis as a sequel to gonorrhœa. Reclus<sup>1</sup> found that of thirty cases twenty had tuberculosis of the lungs, while ten had a pure tuberculous epididymitis. He also found that a large proportion of patients with Pott's disease had tuberculosis of the testis. In thirty-four he found twenty-seven had tuberculous orchitis and epididymitis, in seven of which the epididymis alone was affected. The question may be asked, why tuberculosis so frequently starts in the epididymis? I suppose the cause is the same as in tuberculous epiphysitis; that tuberculous bacilli are free in the blood or conveyed by amœboid cells, and that some slight injury to the epididymis, with its long tortuous artery, may disturb the circulation in the very fine capillary system, closing same by coagulation of the blood, while the others may not be able to dilate freely on account of the surrounding dense fibrous tissue. The same disadvantage may, therefore, occur as in epiphysitis, and the tuberculous bacilli probably easier be arrested, and then commence to grow at this point and form a minute nodule of infectious granuloma. This is only one of many theories, although the most plausible, and it seems almost superfluous to mention other theories.

Virchow,<sup>2</sup> for instance, holds that small miliary tubercles form in the loose intertubular connective tissue, and that they

<sup>1</sup> See International Encycl. Surgery, Vol. VI., p. 619, etc.

<sup>2</sup> See International Encycl. Surgery, Vol. VI., p. 620.

never originate in the epithelium in the interior of the tubules. They also form, according to him, in the parietal connective tissue, especially in that of the mucous membrane, as in epididymitis, vas deferens and seminal vesicles.

Nepveu holds that the miliary nodule springs from the adventitious coat of the bloodvessels; Demme and Villemin consider tuberculosis an interstitial process.

Some authors contend that true tubercle always develops in the connective tissue, others that the disease is originally developed in the tubes of the testicle; others again decline to state positively, whether in the testicle the proliferation commences in the intratubular epithelium, making its way from the centre toward the periphery as in the epididymis, or whether it invades the layers of connective tissue from without inward, finally affecting the epithelium. Soulé maintains that it begins in the epididymis as a catarrh of the seminal ducts, and spreads thence to the testis. The whole question may be of importance to the pathologist, but less so to the surgeon.

The disease is most common in young adults, commencing as an indolent swelling at the epididymis, which gradually increases, suppurates and perforates, leaving fistules behind, and in rare cases a hernia of the testis.

Hutinel and Deschamps<sup>1</sup> state that although tuberculosis of the testis is considered rare in infancy, they nevertheless found nine cases in fifteen months. It may occur very early, even be congenital, and oftener in left testis than right. It may commence very acute and the course is about as in adults, only that in childhood the epididymis is often not affected.

The caseous foci may heal after suppuration or become encapsulated by sclerotic tissue, other tuberculous processes are usually present, as of the peritonæum and the bronchial glands, and the final result is death by miliary tuberculosis or intercurrent diseases. Of the nine patients mentioned, six died of miliary tuberculosis and two disappeared in a bad state.

Jullien<sup>2</sup> has seen seventeen cases in children, and Lannelongue three.

<sup>1</sup> *Archiv. Gen. de Medecine*, April, 1891.

<sup>2</sup> *Archiv. Gen. de Medecine*, April, 1890.



Of these twenty cases, six were under one year of age, six between one and two years, eight from two to thirteen years. In ten cases six showed no heredity, four had sickly parents, two of which had a consumptive father or mother.

All children belonged to the poor, and many of them had other tuberculous affections, such as *ostitis* and *rachitis*. The left testis was most frequently affected. Of Jullien's seventeen cases eight had the left testis affected, four the right and five both. An undescended testicle was never found affected.

Gerster states that tuberculous epididymitis and orchitis is a common sequel of urethral tuberculosis and is then generally double, while single tuberculous epididymitis is generally of embolic origin.

I have at present a patient in which the descending process is well illustrated.

He entered the hospital two months ago with a concentric hypertrophy of the bladder, cystitis and continual dysuria, for which perineal cystotomy was done. He did not improve, and some weeks later the right ureter was catheterized and the urine from this side found teeming with tuberculous bacilli and full of pus. The right kidney was therefore removed four weeks ago by posterior nephrectomy and found filled with tuberculous abscesses. Four days later the urine was free from pus and tuberculous bacilli, and he improved rapidly.

During the last two weeks he has commenced to fail again. Examination per rectum shows a greatly enlarged and tender prostate, induration of right vesicula seminalis, and in the inguinal region there is a hard, tender infiltration of the right vas deferens, extending more and more downward, although it has not yet reached the epididymis.

I do not know that I can add anything to our knowledge of the symptomatology or the prognosis except, perhaps, in regard to the final results of castration.

Fink reports<sup>1</sup> twenty-nine cases of castration which he had observed during thirty years' practice. Twelve had the right epididymis affected, eight the left, and nine both; fourteen were alive

<sup>1</sup> Beiträge zur klinische Chirurgie.

and well, nine of which had one testicle removed and five both; eight had died of other diseases and six (all singly castrated) of tuberculosis. The extra-abdominal part of the vas deferens was healthy in five of the nine double castrations, but affected on one side in two cases. Even if affected, the statistics show that it was not a contra-indication to castration. In regard to the prognosis of the affection in infancy, it is to be noted that while Hutinel and Deschamps consider it absolutely fatal from miliary tuberculosis, Jullien states that the prognosis is favorable, nine having recovered in three years.

The treatment recommended by all authors may be summed up in a few words: Fresh air, good food, tonics, cod liver oil and a local treatment consisting of incisions and evidement with sharp spoon in the hope of curing the fistules, perhaps aided by mercurial and iodine ointments, and lastly, castration, particularly when the testis itself is affected.

Still, that this treatment does not satisfy the progressive part of the profession, and that the local focus theory is coming to the front, is shown by the many local remedies recommended here, as in other tuberculous affections.

Rebaul, of Marseilles, treated three cases of this disease by injection of naphthol-camphor, injecting four or five drops every eight or ten days into the thickened tissues of the testis and epididymis. Marked improvement was effected, the diseased parts becoming more indurated and contracted, while other measures had previously been used for a long time unsuccessfully; others have used carbolic acid and iodine, others again electricity. Lannelongue has recommended the injection of chloride of zinc about the tuberculous foci, forming an encapsulation of inflammatory tissue, and Verneuil has used iodoform dissolved in ether or olive oil. I have used several of these methods, particularly the iodoform emulsion, but without much apparent result. I have seen and treated quite a number of tuberculous epididymitis in the usual way, with incision and sharp spoon and general hygienic and tonic treatment, and I do not remember to have seen a single one cured, nor have I succeeded in curing a single fistule. After some weeks or months the patients have been lost sight of. Of

single castrations I have had two cases during the last year, of double castrations one, and all three have kept well since. The case of double castration was that of Mr. J. H. R., fifty years of age, a contractor and builder by occupation. In December, 1889, he noticed that the left testicle commenced to swell, and he ascribed it to injury from riding a great deal over rough pavements. A physician punctured and injected with iodine a moderate hydrocele on this side. Three months later, in June, 1890, the right testicle commenced to swell, while at the same time supuration occurred on the left side, and three fistules were formed. As he suffered greatly from pain and could not attend to his business, he entered the Sisters' Hospital in September, 1890. He had then a considerable hydrocele on the right side, which was injected with iodine. A great hardness was noticed of the epididymis.

On the left side the tunica vaginalis was opened by incision and found transformed into a pus cavity, from which three fistules led into the degenerated and caseous testicle. The epididymis was smaller and hard, and contained several pus cavities. The left testicle, with all its coverings, was removed in toto. The vasa deferentia were healthy as were the vesiculæ seminales.

The patient returned to the hospital in October and demanded the other testicle removed. It was found in the same condition as the left, and was removed. He again entered in December, 1890, with a considerable swelling along the vas deferens, and extending upward into the inguinal canal. The inguinal canal was opened in its whole length, the peritonæum peeled off and the cord severed behind the internal ring. The wound was closed with sutures and healed by first intention. The cord was found tuberculously infiltrated. The patient has since enjoyed good health.

While castration is the only resource left when the testis itself is affected, it has, of course, many disadvantages, not least of which is the psychical effect upon the patient. It occurred, therefore, to me to remove the epididymis early, before the testis had become infected, and I carried it out in the following two cases:

CASE I.—J. C., aged twenty-eight years, entered the Sisters' Hospital on January 16, 1891. He had had a swelling of the right epididymis for four months; it had been lanced, and a great deal of pus and tuberculous material evacuated, but the incisions had not healed. Three weeks before his entrance the left testicle commenced to swell. Examination revealed great swelling of both epididymis, the left being the largest. A sinus was seen in the lower part of the epididymis. Several softened and fluctuating spots were discovered in the left epididymis. The cords were healthy; no lung complication; left vesicula seminalis slightly indurated. Under chloroform narcosis the left epididymis was incised and about a half ounce of pus removed. The cavity was scraped, the wound closed and the cavity then filled with iodoform emulsion. Although the wound healed by first intention, the induration continued and slowly increased. On February 10, 1891, the scrotum was therefore opened by a longitudinal incision over the epididymis and all indurated tissues removed with scissors. The testis appeared healthy and was not disturbed. On March 9 the right epididymis was removed by a similar operation. Both wounds healed by first intention, and the patient was discharged on March 24 and has been well since. From a letter from him of December 4, 1892, I quote:

"I may just mention that through your 'skillful operation' I have been a new man since, and have had no trouble whatever since I left the hospital."

CASE II.—H. M., aged twenty-six years, entered the Sisters' Hospital on November 10, 1891. After a slight injury he noticed five months previously a small indurated lump in the lower part of the right epididymis, which gradually increased and perforated the skin, leaving a fistula. Three weeks previous to entrance he noticed a similar swelling in left testis. Neither in this, nor in the first case, was there any tuberculous history.

Examination revealed great swelling and induration of right epididymis. Right testis was also enlarged, testicular sense absent, a moderate collection of hydrocele fluid present and a small fistulous sinus over the lower part of the epididymis, left epididymis smaller and indurated; testis seems normal, testicular sense present.

Vesiculae seminales and cords were healthy. November 11, under narcotics, a half drachm of pure carbolic acid was injected into right tunica vaginalis and a similar amount of iodoform emulsion into the left epididymis. The sinus was opened and scraped with a sharp

spoon and plugged with iodoform gauze. The iodoform injections were repeated once a week with slight improvement. The right testis did not improve, and on November 25 it was largely opened, and as it was found in a state of tuberculous degeneration and contained a number of abscesses, it was removed in toto.

He left the hospital on December 12 with the left epididymis still swollen but considerably harder. He entered again in January, 1892, complaining of unceasing pain and swelling in left epididymis. On January 13, 1892, the left epididymis was removed by posterior incision. It was found indurated with several pus-foci, surrounded by a tuberculous membrane.

He left the hospital recovered and has been well since.

The microscopical examination in all three cases revealed tuberculous bacilli.

The objection may, of course, be raised to this operation, that it removes the excreting duct of the testis, and that the patient, therefore, if both are removed, is sterile and the testes must atrophy. But a patient with a double tuberculous epididymitis is sterile anyway, the semen does not contain spermatozoa, the testes must atrophy unless the worse thing happens, that it becomes secondarily tuberculous, the danger of extension to the prostate, bladder and kidney is largely removed. Furthermore, you can probably persuade any patient to have his epididymis removed, while all would shrink from being unsexed by a double castration.

Lastly, you can promise him speedy and radical relief by a simple operation, without any danger whatever. I have labored under the belief that this proceeding was original with myself, but lately I came across a report: *Mittheilungen aus Köllner Burger Hospital, 1887*,<sup>1</sup> in which Professor Bardenheuer advocated the same treatment five years ago.

His premises are that tuberculosis commences in epididymis and attacks secondarily the testis, which may take from six months to ten years; that while tuberculous orchitis demands castration in order to secure healing and prevent infection, tuberculous epididymitis demands only the removal of the diseased

<sup>1</sup> Report of the City Hospital in Cologne, 1887, in Schmidt's *Jahresberichte*.

epididymis, which ought to be done as early as possible, and lastly, that the patients will submit much earlier, as there is prospect of retaining the testis and facultas coeundi. He reports twelve successful cases.

While castration has been advocated and discredited by different surgeons, this simple little operation has found no mention in any of the surgical works in the English language, and without claiming any priority in the matter I call your attention to it as a means of promptly relieving and curing the distressing symptoms, and without unsexing the patient more than he was before the operation.

## A CASE OF LAMINECTOMY FOR DEPRESSED FRACTURE OF THE SPINE.<sup>1</sup>

REPORTED BY J. COLLINS WARREN, M.D.,

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IN view of the interest which is now taken in the surgery of the spinal cord, it seems worth while to report this case, which was operated on over twenty-five years ago at the Massachusetts General Hospital, but which has never been published. The specimen, which came into my possession recently, was prepared by Professor Thomas Dwight, who was the house officer at the time, and was in charge of the case. The account given below is made up partly from the hospital records and partly from Dr. Dwight's recollections.

J. S., seventeen years of age, a laborer, entered the hospital March 26, 1867, having been struck by a heavy box of merchandise, which had fallen from the fifth story of a building. The blow threw him forward so that he struck his nose against a neighboring box, fracturing the nose and bruising the face.

The patient was a tall, finely-formed young man, apparently very healthy, and an excellent patient. On examination, a marked projection was observed between the scapulæ, with considerable swelling at about the sixth dorsal vertebra. Crepitus was detected over the spinous processes in the immediate neighborhood of the swelling in the back. Pulse 60 and weak; body cold; both pupils largely dilated, the right one being rolled upward and outward. The patient laid in bed in a semi-comatose condition. There was no motion of the legs; priapism was noticed in the afternoon of the first day. There was some fever then, and the pulse was 120 and weak.

The record states that on the following day it was evident that there was no motion or sensation in his legs.

On the third day the entry is as follows: "Paralysis very probable; abdomen tympanitic. March 31, fourth day, mind is clear."

<sup>1</sup> Operated upon in 1867 by the late Dr. J. Mason Warren.

The urine was drawn daily with a soft catheter, great care being used to avoid any injury to the bladder.

The operation was performed on March 31, the fourth day, by Dr. J. Mason Warren. It was done as a desperate measure, without great hope of success, Dr. Dwight having been repeatedly charged by him not to urge it upon the friends of the patient.

An incision eight inches long was made in the median line of the back in the dorsal region over the projecting spines of the fifth to seventh dorsal vertebræ, inclusive. These spines were fractured, and were detached with forceps. The laminae of the sixth dorsal vertebræ were fractured with the transverse process and depressed. This fragment was removed together with the fragment of the inferior articular process of the vertebra above. On exposing the dura mater it was found to be punctured. The dura mater was laid open, and a clot as large as a ten cent piece, but thicker, was found on the cord and was left undisturbed. There appeared to be no depression in the cord. The membranes showed no signs of inflammation. There was but little hæmorrhage during the operation. The edges of the wound were brought together by sutures, and a water dressing was applied. There was considerable sero-sanguinolent oozing from the wound during the day, which was checked by ice water.

The improvement which followed the operation was unmistakable. The same evening the feet were much warmer. Pulse, 100.

On April 1, the second day, the patient complained of some pain in the bladder. In the evening reflex movements were observed on tickling the feet. Firm pressure on the abdomen was noticed by the patient.

On the third day reflex action was found to be good below the seat of fracture. Sensation was noticed in the thighs. Several ecchymoses were found for the first time over the right iliac fossa. Involuntary discharges from the rectum were recorded on this day.

The patient continued to improve slightly until a day or two before his death, when a chill occurred followed by fever, after which he sank rapidly, and died on April 8, the twelfth day from the accident and the eighth day from the time of operation.

*Autopsy.*—Head: no fracture of vertex or base; brain normal. Thorax: nothing abnormal.

Fracture of pelvis one inch to the right of the symphysis pubis. The spine, from the third to the tenth dorsal vertebræ, inclusive, was removed (Figs. 1 and 2). The spinous process and left lamina and



FIG. 1.



FIG. 1.—POSTERIOR VIEW.

FIG. 2.



FIG. 2.—ANTERIOR VIEW.

Dr. Warren's case of Fracture of Spine and Laminectomy. Specimen secured by autopsy.



left transverse process of the fifth and most of the spinous processes of the fourth and sixth dorsal vertebrae had been removed by operation.

The left laminae of the fifth and seventh dorsal vertebrae were completely fractured at points just inside of the origin of the transverse processes.

An oblique comminuted fracture of the bodies of the vertebrae commenced in the lower posterior part of the body of the fifth vertebra, and extended downward and forward through the sixth into the seventh vertebra. The spine was also twisted on itself as if the fifth vertebra had been bent forward and turned a little to the right on the sixth, whereby some distortion of the canal was caused.

The spinal cord, though rather twisted and pressed upon, showed to the naked eye no unequivocal signs of laceration.

A firm coagulum in the shape of an irregular sphere of perhaps half-an-inch in diameter lay along the posterior aspect of the cord, firmly attached to the membranes opposite the sixth vertebra.

The urine, which had to be drawn after the operation, became thick and cloudy with mucus and pus at the time of the chill, and at the autopsy acute inflammation of the bladder was found, and this was regarded at the time as the cause of death.

The specimen from which the accompanying illustrations are taken is deposited in the Warren Anatomical Museum.

# A CASE OF PERINEAL LITHOTRITY, WITH SOME REMARKS UPON DILATATION OF THE PROSTATE.<sup>1</sup>

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OF NEW YORK.

PROFESSOR OF GENITO-URINARY SURGERY, NEW YORK POST-GRADUATE  
MEDICAL SCHOOL AND HOSPITAL; CONSULTING SURGEON TO ST. LUKE'S  
AND THE METHODIST EPISCOPAL HOSPITALS, ETC.

IT is so seldom that we have the opportunity of observing in one individual the result of different methods of treatment, that I have thought the following case might be of interest and worthy of comment.

In the autumn of 1889 I was called to a distant town to see a gentleman who was reported to be suffering extremely with some bladder trouble. I found a well-preserved, resolute person, aged fifty-nine, suffering constant pain in his bladder, and urinating every ten or fifteen minutes, night and day, the act accompanied by violent straining. The urine was foul and loaded with muco-pus, which at times was stained with blood.

The first examination revealed the presence of stone. He came to New York, to St. Luke's Hospital, where I did a supra-pubic cystotomy and removed a stone weighing nearly 400 grains. The bladder was in an extremely bad condition, the mucous membrane soft, bluish-red in appearance and ready to bleed upon the least touch. There was also a prostatic outgrowth on each side of the opening of the urethra about the size of a large cherry. These were thoroughly excised until the opening from the bladder into the urethra was unobstructed. Syphon drainage was instituted in the usual manner. For the first four days his condition was very bad, and he suffered extremely. Then there was relief to his pain, a cessation of the convulsive expulsive efforts of the bladder, and for twelve days he did well in all respects. Then began a rise of temperature from 101° to 103°, for which no cause could be ascertained. There was no

<sup>1</sup> Read at the meeting of the New York Surgical Society, February 8, 1893.

source of suppuration anywhere, and I came to the conclusion that a change of air would be necessary to rally his vital forces, and accordingly sent him to his country home. Within twenty-four hours after his return his temperature suddenly dropped to normal, and the reports from him continued to be for some months of a most encouraging kind, excepting that he was obliged to resort to a frequent use of the catheter in order to relieve the bladder. He had the ability to expel a small quantity of urine, but was compelled to lie on one side or the other in order to accomplish this. He remained in this condition for about six months, when word was sent that he was again urinating with great frequency and pain, and that he was thought to have another stone. I found that he had an attack of prostatitis with an aggravation of his cystitis. Searching of the bladder revealed no stone. He was put to bed again, and the washing of the bladder was instituted systematically, with the result that in two weeks there was a very great improvement in his condition. But when he considered himself at his best he was obliged to urinate every two hours in the manner which I have mentioned, and was compelled to frequently resort to the catheter in order to empty the bladder.

Without entering into the details of this gentleman's condition for the next two years, I may say that he has had these attacks of pain with frequent and violent urination at varying intervals. Repose in bed and careful ablution of the bladder would, in a few days, get him back to what he was pleased to consider his normal condition.

In February, 1892, he had so severe an attack of this nature that I felt tolerably certain another stone had formed. Accordingly, he came to New York for a few days and I searched him most carefully, finally putting in an evacuating tube and with the evacuator driving a current of fluid with considerable force through the bladder. The results were entirely negative. There was not even the slightest "click." After this he improved somewhat, but during the spring and summer of 1892 his visits to me were fugitive, and his condition gradually became worse, until finally he was bed-ridden, and in October I was sent for again. On searching, which was done quickly and cursorily because of his pain, a stone was immediately detected. It seemed to be of small size, and I concluded that litholapaxy with cocaine anæsthesia would remove it. For this purpose he came to the city. He was then suffering extremely, the expulsive efforts of the bladder being agonizing. Not even with the aid of the strongest anodynes could he obtain the slightest relief. There was no difficulty

in *introducing* instruments or the catheter, but it was impossible for him to empty his bladder without the aid of the latter. The first introduction of the lithotrite revealed the presence not only of this stone, but of another, apparently of large size, and there was also an encrustation of the anterior wall of the bladder. I crushed the movable stone, washed it out and then desisted, for the purpose of considering with him the necessity for a more extensive operation. My experience with him in the previous supra-pubic operation had been so hazardous that I hesitated to propose this. The sensations conveyed through the lithotrite satisfied me that the stone or stones were soft and could easily be reached through the perinæum, and that the latter opening would give me better drainage than the supra-pubic alone. I accordingly proposed to him the operation of perineal lithotripsy, or Dolbeau's operation. This was done November 10, 1892. The operation, as you know, consists in passing a grooved staff into the bladder. The tissues of the perinæum are then incised until the point of the knife enters the staff behind the bulb of the urethra, and the opening being made free enough to receive the point of Dolbeau's bladed dilator, the latter is entered and held firmly against the staff. The blades of the dilator are then gradually and slowly dilated to their widest extent, which forms a channel in the perinæum. The dilator is then closed and, guided by the staff, which is depressed to an angle of  $130^{\circ}$  or  $140^{\circ}$  to the plane of the abdomen, its point is made to enter the neck of the bladder. The staff is then withdrawn and, the dilating instrument being firmly held, is again gradually and slowly dilated. In this way a canal of from one inch to one and one-half inches in diameter is made, and through this the crushing instruments are easily introduced into the bladder.

The exploring finger showed that the floor of the bladder was occupied by a large number of irregularly-shaped calculi, and that the whole neck of the bladder, with a portion of its anterior wall, was also encrusted. After considerable labor these were removed, and the bladder wall thoroughly curetted. The débris weighed 700 grains.

The removal of the stones and the cleansing of the bladder was the prolonged part of the operation. A rubber drainage tube was placed in the bladder through the perineal wound and was completely surrounded by a close packing of iodoform gauze. The other end of the tube, lengthened by splicing, was weighted and placed beneath a solution of boric acid in a large bottle. Syphon drainage was thus instituted and was perfect, excepting when the tube was stopped from

time to time by masses of muco-pus, which for nine days were being constantly formed. After that the drainage was uninterrupted, and the relief to the bladder was very marked. On the fifteenth day there was a sudden rise of temperature to  $101^{\circ}$ , which persisted four days, then gradually declined, and after that his convalescence was a very satisfactory one. The drainage was maintained for four weeks, and after the tube was withdrawn the perineal wound healed in eleven days. The expulsive power of the bladder was quickly regained, and he was able to urinate *standing* from the first.

At present the interval of urination during the day varies from four to six hours, and this is under the control of his will. At night the interval is from seven to nine hours, according to the amount of sleep he takes. There is no tenesmus and none of the urgency to urinate which he had after the first operation.

He is able to urinate spontaneously *standing* and in a full stream, and when the catheter is passed once a day for the purpose of washing there is only one and rarely two ounces of residual urine. This improvement in his power of urination is the result to which I wish to call your especial attention. During the first operation the apparent obstacles to urination, namely, the prostatic outgrowths and the calculus, had been removed, and *after* the operation the bladder had been drained as long and kept as clean as after the second. But there was very little spontaneous urination, and the act was accomplished in a hesitating, dribbling stream, leaving a notable quantity of residual urine to decompose and fret an already irritable bladder. After the perineal operation, however, he was able to stand up and almost entirely empty his bladder in a strong, full stream with every sense of comfort. An explanation of the difference in the result must be sought for, and I think it is to be found in the enormous dilatation to which the prostatic urethra was subjected in the perineal operation. This fact, I believe, has an important bearing upon the many failures to obtain spontaneous urination after prostatectomy.

It should be remembered that the prostate surrounds the neck of the bladder and the urethra; that its enlargement may consist not only of an outgrowth into the cavity of the bladder, but of a hyperplasia of that portion of it which is external to the latter. Its constituent tissues, whether muscular, glandular or fibrous, are hyperplastic in both localities and may be contractile. Hence it follows that in many cases, even if the outgrowth, *i. e.*,

the part which projects into the cavity of the bladder, be carefully and thoroughly removed, that portion which surrounds the urethra may be so rigid and contracted that no relief to urination is obtained. In opening the bladder from above I have frequently endeavored to test the rigidity and contraction of the neck of the bladder and prostatic urethra to which I refer by introducing my finger from within the bladder. This condition can usually be appreciated by making counter-pressure with the other hand against the perineum, which will also enable the operator to estimate the amount of force required to dilate this unyielding portion. Although in the first operation I removed the prostatic outgrowths which seemed to be the chief cause of urinary obstruction, and dilated the prostatic urethra with my finger, yet after that, so far as urination was concerned, he was no better than he had been before. Belfield, in his paper on prostatectomy, speaks of the necessity for this dilatation, but I am of the opinion that the finger is not sufficient. Whether the great dilatation which resulted from the powerful expansion of the Dolbeau instrument may have paralyzed or ruptured some of the muscular fibres of the prostate, I am unable to say, but at all events from that time on the prostatic urethra has remained widely open, and has offered very little obstruction to the emptying of the bladder.



# TRANSACTIONS OF THE NEW YORK SURGICAL SOCIETY.

*Stated Meeting, February 8, 1893.*

JOHN A. WYETH, M.D., Vice-President, in the Chair.

## THORACOPLASTY BY SUBCUTANEOUS EXCISION OF RIBS.

Dr. F. LANGE presented a girl, seven years of age, upon whom he had operated for an empyema of more than six months' standing. When he first saw the patient, in October, 1892, she was extremely emaciated, due to profuse suppuration. The abscess cavity was so large that a diminution of it through expansion of the shrunken lung could not very well be hoped for. The object of the operation was to make the thoracic wall over the cavity sufficiently movable to allow it to become depressed. The general condition of the patient was so extremely reduced that an operation with great loss of blood was out of the question. It was necessary to remove the posterior convex arch of the ribs from a point near the insertion of the large muscles of the back to the anterior axillary line in front. This would involve the arched portion of the ribs, and yield a considerable amount of depression at the expense of the thoracic cavity.

The operation was performed as follows in the case presented: An incision was made beginning between the scapula and vertebral column at a point corresponding to the third rib, and carried downward as far as required, according to the number of ribs to be removed. Another incision was made in the anterior or axillary line. Between these two incisions each rib, to a limited extent, was stripped of its periosteum and cut across with bone scissors. This movable portion of the rib was then grasped with the bone forceps, and lifted out of its periosteal envelope. Usually the periosteum on the upper edge of the ribs will yield more readily to an instrument working from the vertebral column forward, while that on the lower edge can be more easily removed by an instrument working from the anterior

incision backward. Small, adherent shreds of periosteum can be readily loosened by slightly twisting the rib. The parallel empty cylinders of periosteum are left. By means of the operation the size of the abscess cavity is lessened and the new formation of a resistant thoracic wall is allowed.

In the patient presented, five ribs were removed after the manner described, beginning at the third rib. A small resection of the lower ribs was also done for the purpose of drainage. The operation required two sittings, owing to the extreme weakness of the patient. Since the operation the cavity has rapidly diminished in size, the discharge of pus has become less, and the general condition of the patient is markedly improved. There is still a small cavity left, containing about half an ounce of fluid, but the chances for a complete recovery are very promising. Repeated searches for tubercle bacilli have given a negative result. In an adult the operation is more tedious, on account of the intimate insertions of the muscles of the back.

Dr. JOHN A. WYETH said that in the removal of the ribs he had always found it quite easy to take out the rib from its periosteal attachment and sheath without opening into the pleural cavity.

#### SARCOMA OF AN UNDESCENDED TESTICLE.

Dr. CHARLES MCBURNEY presented a patient, a young man, who was brought to him the middle of last December suffering from the existence of a somewhat peculiar abdominal tumor of considerable size. The tumor could be readily felt. It extended from the pubes to one inch above the umbilicus, and about four inches to each side of the median line. It was nearly spherical, quite firm to the touch and gave rise to considerable pain. The growth was quite movable. Its appearance had been first noted about a year before. The condition of the patient was somewhat unusual, also. His legs and feet and portions of his thighs were cedematous to a marked degree, with great enlargement of the veins. Throughout the entire extent of the abdominal wall, and of the thoracic wall as well, there was enormous enlargement of the veins, the vessels crossing themselves in every direction.

An operation was undertaken with a view to determine the exact nature of the tumor, a suspicion of which existed from the fact that the testes were not found in their usual situation. The incision, made

in the median line, met with a large amount of venous hæmorrhage, and exposed a reddened, smooth tumor, ovoid in shape, which was found to be practically unattached excepting at one point. During its enucleation it was clearly seen that the growth consisted of an enlarged right testis, and that its pedicle was formed by the cord running in its usual direction. A portion of the epididymis was also recognized. The pedicle was ligated and the tumor removed.

Dr. McBurney said that when he undertook to close the abdominal wound he found the veins to be so numerous and of such large size, and still so distended with blood, that the use of the needle would certainly have been followed by profuse hæmorrhage and considerable loss of time. This difficulty he met by grasping the deeper layers of the abdominal wound on each side with forceps throughout the entire length of the wound; six pairs of forceps were required on each side. Each pair of forceps was then crossed with the corresponding pair on the opposite side, and a ligature tied at the base of the two; in this way the tissues were kept in exact apposition. The superficial portion of the wound was left open and treated by packing. The forceps were left in position for ten days, and when they were removed union was found to be complete. The granulation surface left was subsequently scraped, and the edges of the wound, which were no longer especially vascular, were sutured.

The œdema and vascular changes, Dr. McBurney said, were, of course, due to pressure, but it appeared to him to be somewhat singular that a tumor of this moderate size should produce such a marked effect in every direction, when tumors of much larger size generally do not do so at all. It could only be accounted for by the close fitting of this growth to the brim of the pelvis, thus causing unusually complete occlusion of the iliac veins. The tumor proved to be a round-celled sarcoma of the right testis.

DR. LANGE remarked that since Dr. McBurney had not tried a suture in his case and thereby got dangerous bleeding, he was inclined to assume that in this case, like in others of abdominal tumor with hæmorrhage from dilated veins of the abdominal wall, after removal of the tumor the veins would collapse, and suturing might not have been as dangerous as assumed, especially since the abdominal wall, by pressure previous to the passing of the needle, could be made bloodless.

DR. MCBURNEY, in reply to Dr. Lange's remarks, said that he had already distinctly explained why sutures were not used. The

patient was in very feeble condition, and the loss of a few more ounces of blood and of additional time might have led to a fatal termination. The tumor had already been removed, and there was no hope that the veins would collapse. The fact was, that they had not collapsed at the time when the abdominal wound required closing.

DR. LANGE rejoined that Dr. McBurney overrated the danger of bleeding. Not unfrequently we cannot avoid large vessels in securing large pedicles and adhesions in intra-abdominal operations. As soon as the suture or ligature is tied the bleeding ceases. We also do not hesitate to press needles through vascular tumors with distinct intentions. He inquired whether in all the layers of the abdominal wall the veins were so much dilated that neither peritonæum nor fascia could be sutured.

If the veins did not collapse, then there was probably some additional compression, perhaps, through metastasis higher up.

DR. MCBURNEY replied that he had not overrated the danger of bleeding in this particular case, which was the only one under discussion. The abnormal vascularity involved all the different layers of the abdominal wall, and the danger was a perfectly evident one. While he was not exceptionally timid in regard to hæmorrhage, he had found it good practice in surgery to avoid, when possible, the passing of a needle and suture through a large vein. If this were done the tightening of the suture would frequently enlarge the opening formed by the needle, and lead to considerable bleeding. It was now two months since the operation was done, and there was still marked dilatation of the vessels of the abdominal wall.

#### HYPERDISTENTION OF THE PROSTATIC URETHRA FOR RELIEF OF PROSTATIC OBSTRUCTION.

DR. L. BOLTON BANGS read the paper of the evening on the above subject. (See page 442.)

DR. MCBURNEY said that the dilatation of the prostatic urethra in these operations is an interesting question, and one that has been too much neglected. Following supra-pubic operations, he had always had more or less difficulty in draining the bladder, and it had occurred to him whether this difficulty could not be obviated by making the perineal opening, if a sufficiently large opening could be made there with impunity, answer the purpose of the operation. Of late years he has done very little work in the bladder through the

perinæum. Formerly, he often employed the median incision, particularly in young subjects.

DR. WYETH said he thought a good deal of the trouble in connection with drainage after supra-pubic cystotomy came from the lack of close attention to the condition of the drainage apparatus during the first twenty-four hours. The tube often becomes choked up by blood-clots. He has up to the present time employed this method of drainage in thirty cases, and in none of them did any serious difficulty arise. When the tube becomes stopped up, it can be readily cleaned. The air should be excluded from the bladder by packing gauze around the tube. The flow of urine through the tube should be regulated, so as not to exhaust the bladder. Dr. Wyeth said he considered Dr. Bangs' suggestion of hyper-distending the prostatic urethra a very valuable one.

## EDITORIAL ARTICLES.

### SOME RECENT CONTRIBUTIONS TO THE SURGERY OF THE STOMACH.

SCHRAMM,<sup>1</sup> KRIEGE,<sup>2</sup> KAENSCHKE,<sup>3</sup> ROSENHEIM,<sup>4</sup> VON NOORDEN,<sup>5</sup> have all published interesting papers on this subject.

I. Von Noorden says that gastrostomy for cesophageal stenosis is only justified where the surgical procedure offers the patient an improvement in condition, and the possibility of relief from the symptoms due to the progressing starvation. He prefers Witzel's<sup>6</sup> operation, in which he is sustained by Mikulicz, who asserts that the superiority of this method has been demonstrated in all the cases he has operated upon lately.

The operation is briefly described. An incision is made under and parallel to the costal arch, and the anterior stomach wall is drawn up into the wound. Two oblique longitudinal folds, running upward from left to right, of the stomach walls are raised and drawn together over a rubber drainage tube of the thickness of a lead pencil by a series of Lembert sutures. The lower end of this tube should previously be inserted into the stomach through a narrow opening made into the posterior portion of this channel. Further suturing may be employed to bring together more layers of the stomach wall. The second step of the operation consists in attaching the stomach to the abdominal walls. The drainage tube is conducted out of the edge of the abdominal incision nearest to the median line, and the rest of

<sup>1</sup> Wiener Medizinische Presse, November 20, 1892.

<sup>2</sup> Berliner Klinische Wochenschrift, December 5 and 12, 1892.

<sup>3</sup> Deutsche Medicinische Wochenschrift, December 8, 1892.

<sup>4</sup> Deutsche Medicinische Wochenschrift, December 8, 1892.

<sup>5</sup> Berliner Klinische Wochenschrift, January 2, 1893.

<sup>6</sup> Centralblatt für Chirurgie, 1891, No. 32.

the abdominal incision is closed. The transversalis and rectus muscles should be split parallel to their fibres, and the drainage tube drawn through these openings, so that when the muscles reunite they control the opening into the stomach.

It is, therefore, evident that the new alimentary canal does not lead into the stomach directly in a straight line, but runs obliquely; in order to escape, the contents of the stomach must pass through this indirect canal, rendering regurgitation almost impossible.

Mikulicz has operated in this way five times with excellent results. The first case was a man, fifty-two years of age, who had a stricture of the œsophagus, 32 cm. below the teeth. At the operation a portion of the anterior stomach wall, measuring 15 cm. in length and 10 cm. in breadth, was drawn out and held by an assistant's fingers at each end of the abdominal incision, and the region was surrounded with aseptic compresses, that there might be no danger of infecting the rest of the peritonæum during the manipulations of the stomach. About 6 cm. of a rubber drain was then sewed into the raised stomach fold with simple peritoneal muscular layer sutures of fine silk, until the drain was well imbedded in the stomach wall. A second, and in some places even a third, row of stitches were applied. A very small incision was then made into the stomach at the lateral end of this canal, and the end of the drain was inserted through the opening. None of the contents of the stomach escaped. About 3 cm. of the tube protruded into the viscus. The tube was then sutured to the stomach wall with catgut and surrounded as in the canal. The superior surface of this newly-formed canal was then sutured to the parietal peritonæum by several silk sutures, so as to insure its attachment to the abdominal wall and render the field of operation permanently extra-peritoneal.

The stomach was then distended, by feeding through the tube, with milk and wine, and the patency of the line of suture was then clearly demonstrated, as none of the fluid escaped. The abdominal wall was carefully closed with "étage" sutures, the free end of the tube being left out at the end of the incision nearest to the median line.

This open end of the tube was compressed by means of a spring forceps. The patient recovered strength rapidly, and eighteen days later the tube was withdrawn and left out for a time, but there was no escape of the contents of the stomach along the fistula. A permanent tube, however, is considered safer for patients to use themselves than to allow them to insert it before every meal.

The second case was a woman fifty-eight years of age who had had symptoms of stricture of the œsophagus for five months. The operation was in every way similar to the former case, and she was well in two weeks. The third case was also a woman fifty-six years old, in whom a high tracheotomy had to be performed in consequence of a paralysis of the posterior crico-arytenoid muscles of both sides. A sound could not be passed through the œsophagus. The only difference in the operation in this case was that the tube was fixed in the stomach before forming the canal. Her recovery was quite as good as the other two cases. The fourth patient was only twenty-seven years of age. In this case an oblique incision not parallel to the costal arch was made. On opening the stomach the region of the wound was inundated by the stomach contents. There was one place at the lower margin of the wound where it did not seem advisable to stitch the peritoneal layers together, and this was packed with iodoform gauze. The rest of the wound was treated in the usual way. The œsophageal stricture was finally overcome to such an extent in this case that the gastric fistula was closed at the end of two months.

The fifth case was in a wretched condition when the operation was performed: the patient was a man sixty years old, whose trouble dated back a year. The stomach was empty and much contracted. The progress of the case was decidedly satisfactory.

In these cases a tube suggested by Mikulicz may be employed. This consists of a glass tube 4-6 cm. long, which is expanded into a small, round disc at the junction of the upper and middle thirds. A second tube is then fused within this one in such a way that nothing can get between them. When one end of this tube is inserted



into the fistula the disc can be pressed firmly against the orifice, and held there by adhesive plaster. The free end of the tube can be closed with a rubber cork.

This tube may remain in place eight days and longer, does not allow anything to pass alongside of and does not irritate the tissues.

Van Noorden believes that this operation should be performed as soon as fluid and soft food can no longer pass without obstruction, or as soon as it is evident that nutrition is not being fully sustained.

II. Kriege reports a case of gastric ulcer with perforation cured by operation. So far as his investigations go this is the only case of perforation following an ulcer of the stomach in which this result has been obtained. His patient was a man forty-one years of age who had had gastric trouble for twenty years with hæmatæmesis. Sudden symptoms intervened, which led to the diagnosis of a perforation of a gastric or duodenal ulcer. An incision was made in the linea alba, from the xiphoid process to the umbilicus, and when the peritonæum was opened there was an outrush of odorless gas. The stomach contents were found in the peritoneal cavity, especially on the left side, but there was scarcely any injection of the peritonæum. At first no perforation could be discovered, but finally, after the incision had been carried well to the left, at right angles to the first, through the rectus muscle, exposing the whole stomach, a perforation was found three cm. from the cardiac opening nearer to the fundus than to the beginning of the small curvature. The opening was about the size of a pea. The suturing was very difficult, but was finally successful. The blood and contents of the stomach were then removed from the peritoneal cavity by means of sterilized compresses, and the abdominal wound was closed except at the ends of the incisions, where an iodoform gauze tampon was inserted. The patient was allowed absolutely no food per os, not even pieces of ice. Thirteen days after the operation the first food was allowed to enter the stomach, and at the end of three weeks the patient was permitted to get out of bed. About five weeks after the operation an empyema of the left side was discovered.

and a piece of the tenth rib was resected, allowing the discharge of about one-half litre of ill-smelling pus. Three and a half months later the patient had fully recovered his strength.

Another case of the same kind was operated upon, an incision being made from the xiphoid process down to a point one hand's breadth above the symphysis. Some peritonitis was present in this case, accompanied with so much meteorism that it was necessary to puncture the intestine in five places. The stomach also had to be punctured. All these openings were closed with silk sutures. The anterior wall of the stomach was agglutinated to the liver, and when these adhesions were broken up fluid ran out in considerable quantities, but no perforation could be made out. When pressure was made on the fundus, stomach contents stained with bile came from the upper part of the cavity, and a transverse incision was made through the abdominal walls to the left, when a perforation was discovered, the size of a five-cent piece, near the cardiac orifice. About one-half litre of gastric contents were dipped out and the hole closed with three silk sutures and five "etage" sutures. The abdominal cavity was cleansed, a pus focus in the pelvis being evacuated, and the abdominal wound was closed. The patient was much collapsed at the end of the operation. Eight days later, when everything seemed to be progressing favorably, symptoms of hæmorrhage set in, and she died ten days after the operation. At the autopsy an abscess was found undermining the whole abdominal wound. There was only a localized peritonitis, but a loop of intestine was found which had penetrated a fissure accidentally made in the mesentery at the time of the operation. The intestine was swollen above this point, and a perforation was found in the duodenum near the head of the pancreas. This operation was not undertaken until two days and nine hours after the original perforation occurred.

A summary of six cases of ulcer of the stomach and two of the bowels is given. Of these all died except the one reported by Kriege.

He concludes that the operation is justified and necessary when

the diagnosis can be determined early enough, and skilled surgical aid is at hand. Operation should be performed as soon as possible. It is important to remember the localities where perforation is most liable to occur. Eighty-five per cent. of the ulcers are in the anterior wall of the stomach, and 40 per cent. of those in the vicinity of the cardiac orifice penetrate the stomach, while on the posterior wall only 2 per cent. cause this trouble. If the place is readily accessible it is best to cut out the entire ulcer, or at least its borders, although in difficult cases suture alone will suffice.

Nutrition should be maintained by enemata as long as possible, and even water and ice per os should be avoided. A careful examination should be made after closing the perforation to ascertain whether an encapsulated intra-peritoneal abscess had formed, and the left pleural cavity should also be watched. The results of this treatment will be better in the future than they are at present. The intestinal contents are much more dangerous when they escape into the peritoneal cavity than the contents of the stomach.

III. Schramm remarks upon the surprising number of cases of gastric surgery that have been reported within the past few years, one hundred and thirty cases of resection of the pylorus alone having been reported within the past five years.

The very high mortality following the earlier operations, 70 per cent., caused a more careful analysis, and it was ascertained that in cases where neoplasms had become adherent to the neighboring parts, such as the liver, pancreas and colon, the mortality was 97 per cent., but in those cases which were still only slightly adherent it only amounted to 60 per cent., while where no adhesions existed it was as low as 50 per cent. The operation was therefore contraindicated in the first class of cases, gastroenterostomy offering the best solution for the problem. He reports four cases of cancer of the stomach upon which he had operated. The first, in 1886, remained well for a year, when a recurrence was observed, but the patient was then lost sight of and the subsequent history is not known. The second case was one of resection of the pylorus, and was discharged from the

hospital eleven days after the operation. This patient remained well at the time of the report, eighteen months later. The tumor was found to be an adeno-carcinoma. The third case was firmly adherent to the liver and colon, and gastroenterostomy was performed, and three weeks after the operation the patient was in a very satisfactory condition. The fourth case was also one of gastroenterostomy, in which the report is that the patient's condition was tolerable and remained so for three months.

Cancer of the stomach should be subjected to early operation. Physicians should refer these cases to the surgeon as soon as the diagnosis of cancer of the stomach is made out, and the patient should be informed that an immediate operation is the only relief he can obtain. Where this is done the mortality following resection of the pylorus will be decidedly reduced. The sutures must be applied very accurately, their parting means the death of the patient. In Billroth's clinic a collection of the causes of death following this operation shows that out of twenty-one cases seventeen died in consequence of the giving way of the stitch. Schramm considers three-layer sutures, strengthened by a few Lembert sutures at the place where the two lines of sutures meet, the best method of proceeding.

If the stomach has been well cleaned and slightly compressed by a four-headed compress placed underneath, the finger pressure of a skilled assistant suffices to prevent the intestinal contents flowing out. This obviates the necessity of making an opening in the mesentery for the passage of a compress.

Resection of the pylorus should not be employed in cases of advanced carcinoma of the stomach, especially when there is a large tumor adherent to other organs. Whenever it is impossible to determine beforehand whether or not resection of the pylorus is possible, and whenever it proves impossible after opening the abdominal cavity, gastroenterostomy should be performed, even though there should not be any stenosis of the pylorus, so as to save the patient the necessity of another operation. In cases, however, where the existence of adhesions, indicating that the resection of the

pylorus is contraindicated can be determined before opening the abdomen, it is advisable not to perform gastroenterostomy, unless there is a very marked stenosis.

The author also reports one case of gastrostomy for carcinoma oesophagi. The patient had not been able to swallow a drop of liquid for two weeks. The stricture was 30 cm. from the teeth, and impassable to any instrument. An opening,  $\frac{1}{2}$  cm. in size, was made into the stomach after it had been attached to the abdominal wall, and a drainage tube was tightly fitted into it. The patient was greatly collapsed before this stage of the operation, and a few table-spoonsful of wine was poured into the stomach, when he began to improve at once. He was then fed with wine and strong broth in small quantities every two hours. At the end of twelve days the wound was healed, but two days later he developed a pneumonia, from which he died eighteen days after the operation.

He advises in these cases of oesophageal cancer that operation should be performed as soon as the swallowing of liquids becomes troublesome, although dilatation will often improve a stricture materially. In many cases, however, the sound cannot be employed, and operation is the only recourse.

Even in very advanced stages the relief to the patient is so great that the operation is fully justified, and in some of these advanced cases a considerable prolongation of life has been obtained. The tendency of the gastric fistula is to grow larger, causing leakage: no efficient means have as yet been devised for preventing this.

IV. Kaensche, at the request of Mikulicz, made a thorough investigation regarding the influence of resection of the pylorus upon the function of the stomach, the general condition of the patient, and the control of the subjective symptoms, in four cases operated upon by Mikulicz.

One of these cases was a young girl who had a round ulcer of the stomach; the others had stenosis from carcinoma of the pylorus. In the first case the ulcer was resected, in two resection of the pylorus was performed, and the fourth case was one of gastroenterostomy.

The condition of the stomach with regard to its functional activity, secretion, motion and absorbability, was carefully determined before and after operation.

The first case was a man forty-one years of age with a carcinoma of the pylorus. On cleansing the stomach of all its contents, considerable quantities of decomposed acid food were evacuated. He was given some test food, which was removed every two and one-half hours to examine its condition. The masses obtained at these examinations were hardly changed by the action of the stomach secretions. The gastric juice, when it was filtered out, was strongly acid, but no free hydrochloric acid could be obtained. There was a large amount of lactic acid. Experimental digestion yielded no results. The gastric juice was incapable of digesting albumen, either when employed by itself or upon the addition of hydrochloric acid, even after twelve hours. Under the microscope there were found undigested muscular fibre, in which the transverse striation was distinctly seen, numerous starch grains and many saccharomyces and sarcinae. Another test meal was given the next day, and some hours later it was removed almost unchanged. The absorbing capacity of the gastric mucous membrane appeared to be intact, as iodine was found in the saliva within thirteen minutes. After the operation the nutrition rapidly improved. In the second case, a woman, forty-two years of age, there had been stomach trouble for two and a half years, and all the symptoms of cancer of the stomach. Lavage brought up large quantities of decomposed food, and the last meal which was withdrawn from the stomach, after three hours, gave an acid reaction. No free hydrochloric acid could be found, but there was an abundance of lactic acid. The microscopic examination was similar to the first case. The gastric juice, when it had been filtered and not diluted, was incapable of digesting albumen in twelve hours, but when hydrochloric acid was added this power returned. There was scarcely any motor power left in the stomach. Six and a half hours after a test meal there was still considerable food left in the stomach. The improvement in the general condition following the resection of the

pylorus was decided. In the fourth case the gastric juice was only feebly acid, and contained no free hydrochloric acid. Albumen remained undigested even after the addition of hydrochloric acid. The muscular force of the stomach was much diminished. Gastro-enterostomy was performed in this case, and there was a decided improvement.

The examination in these three cases showed that the secretory action of the stomach was not influenced by this operation, nor was there any change in the digestion or the power of absorption of the stomach, but the muscular power was considerably increased, and the subjective symptoms were completely overcome. The operation also had a markedly beneficial influence on the strength and weight of the patients.

The fourth case was one of ulcer of the stomach, and the gastric juice was acid, with an abundance of hydrochloric acid and apparently no lactic acid. The digestion of albumen was complete. Under the microscope sarcinae were present, but no saccharomyces or bacteria. A test meal was almost completely digested at the end of six hours. In this case an attempt to remove the remains of a test meal on the twenty-eighth day after the operation caused violent vomiting, slight hæmorrhage and had to be abandoned. She improved rapidly.

V. Rosenheim also discusses the gastric functions after resection of a carcinomatous pylorus. He presented a case upon which he had resected the pylorus for this condition one year and a half before. Her condition was excellent; she had no gastric trouble, had a good appetite and her bowels were regular. Repeated examinations revealed the fact that no bile entered the stomach, and he considered that the pyloric functions were performed by the remaining muscular tissue. Examination during the different stages of digestion proved that that process was absolutely normal. The stomach contained, one hour after taking 300 grams of tea and 60 of white bread, about 70 grams of food paste of neutral reaction which appeared as though it had simply been chewed and then expectorated. The stomach was

empty when it was washed out two and a half hours after a test breakfast, so that the muscular power of this organ had returned. It took the same time to digest and force this meal into the intestine as it did in a normal stomach.

SAMUEL LLOYD.

### HAWKINS ON TUBERCULAR PERITONITIS.<sup>1</sup>

THE term "tubercular peritonitis" is used in its familiar sense, including those cases only in which the peritoneal affection predominates, though deposits are commonly present elsewhere. The impression, gathered from older writers, prevails that recovery under medical treatment is very rare, and the opinion has been growing in strength that the mortality may be materially diminished by operative interference.

König gives an opinion, founded on 131 cases, that by laparotomy 75 per cent. are much benefited and 25 per cent. completely cured.

The same idea finds expression in the valuable paper of Osler, who goes so far as to place "abdominal section for tubercular peritonitis among the triumphs of recent surgery."

In order to ascertain the results of medical treatment alone, 100 consecutive cases were taken from hospital practice (St. Thomas') and critically examined. It was found that all ages were liable to the disease, the range in the series being from 1 to 60 years. Two-thirds of the cases occurred between the ages of 5 and 30 years; 24 of the 100 cases had a strong family history of phthisis.

*The Mortality.*—Forty died and 59 recovered. Of the 59 non-fatal cases there was a tubercular family history in 15 per cent., while in the 40 fatal cases there was a family history in 37 per cent. An analysis of the 59 cases of apparent cure shows

<sup>1</sup> Tubercular Peritonitis: Its Various Forms, Their Surgical Treatment and Comparative Curability. By H. P. Hawkins, M.B., M.R.C.P., London. St. Thomas Hospital Reports, Vol. xx (1892).



20 still enjoying good health

1 well 9 years

1 " 6 "

3 " 4 "

5 " 3 "

2 " 2 "

2 " 9 months.

The remaining 38 cases could not be traced because they had changed their residence to other parts of the country, but there was good reason to believe that the results were as good as in the 20 traced.

These cases show that the general consensus of opinion regarding recovery from tubercular peritonitis as rare and exceptional is erroneous.

In discussing the question of curability by operation the writer has collected 112 cases of tubercular peritonitis where abdominal section has been performed. In many of the cases the disease was not suspected at the time of the operation, and the operation was nothing more than a simple exploration. The view of Lawson Tait, that "most emphatic physiological changes are set up by simply opening the peritoneal cavity," the writer does not believe to be borne out by facts, but is inclined to regard this and similar statements as based upon the old false creed that tubercular peritonitis is almost universally fatal.

*Results of 112 Cases Treated by Operation :*

28 died soon after operation

26 not traced

57 more or less completely recovered

1 well 25 years

4 " 4 "

29 " 1 "

1 " 9 months

1 " 8 "

14 " 6 "

2 " 3 "

3 " 2 "

*Conclusions.*—(1) Operative successes occur in cases of moderate or extreme ascites in the very cases which so commonly recover under medical treatment.

(2) There is little difference in the mortality of the cases whether operation is resorted to or not. Such slight difference as does occur is in favor of operation.

(3) No harm seems to have occurred from the operation, and even in the most gloomy and hopeless cases some degree of improvement seems due to the operation.

(4) Such merit as may be allowed the surgical treatment lies (*a*) in a more prompt and complete removal of fluid than is usually practiced in the medical wards, and (*b*) the removal of larger masses of lymph and caseous products.

(5) The washing out of the abdominal cavity with germicidal solutions is not only futile but wrong in principle. König found in 131 cases that the mortality was greater with irrigation than without.

WILLIAM B. COLEY.

#### HAEGLER ON THE SURGICAL SIGNIFICANCE OF DUST.<sup>1</sup>

THE author states that the doctrine of air infection has gone through many phases. Since Lister endeavored to protect wounds from the air by his first antiseptic dressing, since the time when the smallest operation was not undertaken without "disinfecting" the atmosphere with the spray, the air has been held accountable for many sins of omission, and has had to account for many misconceptions, until the gradually perfected technique of antiseptis, and later the surprising results of asepsis, placed the doctrine of air infection on a broader basis. With the aid of bacteriology, many of the features of the technique of Lister have been done away with. This progress is characterized in that the mystical and fatalistic doctrine of the all-domineering air infection has had to make room for the more real knowledge of contact infection. It was learned to hold the operator and assistants, the fingers and instruments and everything

<sup>1</sup> Beiträge, zur klinischen Chirurgie, Band IX, Heft 3.

which came in contact with the wound accountable for wound infection. Air infection has been relegated to the domain of the phantoms.

The author has endeavored, by a series of experiments, to decide whether this question of air infection shall be rightfully thrown entirely out of consideration. The experiments were made in the surgical clinic of Prof. Socin, in Basel.

After the development of erysipelas in one of the hospital wards, in which no erysipelas had occurred for more than eighteen months, the first experiments were made: The entire room was evacuated, and the bacteriological examination of the air conducted with gelatine and agar on Petri's plates. The exposures were made under three different conditions: (1) An hour after any one had been in the room, and when everything was as quiet as possible; (2) while several persons were moving about in the room; (3) while the floor was being swept dry with a broom.

Plate *a* (gelatine) was placed between the two erysipelas beds thirty centimetres above the floor; plates *b* and *c* (gelatine and agar) stood at the foot and head ends of these beds on a level with the pillows. The time of exposure was five minutes. The following results were obtained:

	Bacteria colonies.	Other fungi.
EXPERIMENT I (quiet room).	Dish <i>a</i> 4	4
	" <i>b</i> 3	1
	" <i>c</i> 2	1
EXPERIMENT II (motion in room).	Dish <i>a</i> 31	6
	" <i>b</i> 22	3
	" <i>c</i> 25	5
EXPERIMENT III (sweeping in room).	Dish <i>a</i> 238	24
	" <i>b</i> 112	38
	" <i>c</i> 164	31

On these plates were discovered as follows:

Plate II. (*a*) Two colonies of *staphylococcus pyogenes aureus*; (*b*) one colony of *staphylococcus pyogenes albus*, two colonies of *streptococcus pyogenes*.

Plate III. (a) Three colonies of *staphylococcus pyogenes aureus* ; (b) four colonies of *streptococcus pyogenes*, nine colonies of *staphylococcus pyogenes aureus*.

The staphylococci were identified by cultures in the various nutrient media and by animal inoculations. By the inoculation of rabbits from four different cultures, subcutaneous abscesses were caused in two cases. In one case the animal perished from general sepsis. The abscess pus gave pure cultures of *staphylococcus pyogenes aureus*. The streptococci were identified in the same manner. Inoculation of a rabbit's ear from an agar culture by a simple prick caused, in three out of five cases, a circumscribed reddening and infiltration. The question as to whether the *streptococcus pyogenes* is identical with the *streptococcus erysipelatis* or not, which has been decided in the positive by the majority of observers, had in this case no great importance. It was of consequence, however, that in the dust in the air of a sick-room pathogenic staphylococci and streptococci were discovered whose vitality could be demonstrated by cultures, and the pathogenic character of which was proven by animal experimentation. Among the 601 bacteria colonies were at least twenty-one pyogenic colonies—fifteen staphylococci and six streptococci.

These bacteria have been repeatedly demonstrated in the air, or in its dust. The *streptococcus erysipelatis* has been cultivated by von Eiselberg<sup>1</sup> from the air of a sick-room, and by Emmerich<sup>1</sup> from the air of a dissecting room. The pyogenic staphylococci were found in the air of sick-rooms and operating rooms by Neumann,<sup>1</sup> von Eiselberg,<sup>1</sup> Welz<sup>1</sup>, Ullmann,<sup>1</sup> Pawlowsky, and in the air of dwellings and stables by Karlinsky,<sup>2</sup> C. Fraenkel<sup>3</sup> and Uffelmann.<sup>1</sup>

In connection with this question of infection from the air, the following investigations arise: Where, and under what circumstances, do these germs occur in the air of the rooms of our surgical pavilions?

<sup>1</sup> Vide Literaturverzeichnis.

<sup>2</sup> Przegląd Lekarskie, 1888. Ref. in Jahresb. v. Baumgarten, 1880.

<sup>3</sup> Grundriss der Bacterienkunde, S. 318.

Under what circumstances is their number increased? Is their number greater in the surgical wards than in the other sick rooms of our hospitals, or in rooms in which no patients are confined? How is this air-infection to be prevented? How is its danger to be lessened?

The whole question rests, not in the examination of the air, but in the examination of the dust which is precipitated out of the air. Tyndall<sup>1</sup> has observed that atmosphere which is free from dust, "optically pure," in the electric light, contains no germs. According to Hesse and Petri, the bacteria are not suspended in the air separately and individually, but either as groups of individuals or upon vehicles such as coarse particles of dust. In all of these investigations, the terms "air" and "dust" have been employed too synonymously. In an unclean room, which is perfectly quiet, the number of germs in the atmosphere is less than in a relatively clean room in which the atmosphere is in a state of commotion. It is only the dust, therefore, which is held in the air that comes into consideration. From the fact that these particles are governed by the laws of gravity, the strata of air nearest the floor in a closed room contains more germs than the higher strata.

In these experiments the dishes of Petri were employed, covered with 10 per cent. nutrient gelatine, after the method of Koch. Examinations of the dust in the air of sick rooms, operation rooms and other closed rooms were made. The hair of the beard and head, and operating coats were, after exposure to the dust in the air, subjected to examination for bacteria. Cobwebs in the corners and niches of the surgical clinic and operating-room were also investigated. In all of these, abundant colonies of mould fungi and bacteria were discovered, especially staphylococci and streptococci.

When the circumstances under which these germs gain access to the air are considered, a multitude of sources are discovered. Suppurating wounds are by no means the necessary source of these germs. Staphylococci and streptococci are found in the normal saliva,<sup>2</sup> and

<sup>1</sup> Medical Times and Gazette, 1870; Naturforscher, 1870, Nr. 13.

<sup>2</sup> Biondi, Zeitschrift für Hyg., II., S. 225; La Riform. Med., 1886, Nr. 3; B. Fränkel, Berliner Klin. Wochenschr., 1886, 17 u. 18.

nasal mucus,<sup>1</sup> from which they are disseminated by expectoration, sneezing, etc. They are found on the surface of the body,<sup>2</sup> in the normal urethra,<sup>3</sup> in faeces,<sup>4</sup> from which they enter the clothing and vessels, become dried, and are liberated as dust. From the dirt beneath the nails<sup>5</sup> they are transmitted to utensils and food. They exist in the earth,<sup>6</sup> and are brought into the clinic on the shoes.

In still greater numbers are these germs mixed with the air by suppurative processes, operations for the liberating of pus, and the dressing of suppurating wounds. Since the dry treatment of wounds has come into vogue, and the wet dressings have been discarded, during the process of dressing, more germs are thrown off with the dust. In the dry dressings of pus-containing wounds, the pus becomes dried and encrusted; and in cutting or bending these dressings, fine particles of desiccated pus are thrown off into the air. If the dressings after their removal are allowed to lie about and be handled in a dry state, still more of the desiccated matter mingles with the dust of the atmosphere. Fortunately these germs in the air perish very rapidly.

The only publication concerning their longevity in a dried state is that of Passet. They were taken from pure cultures and dried upon cover-glasses. At the end of ten days they were still capable of reproduction. The investigation was not carried further than this. Haegler has, therefore, proceeded to continue investigation in this line. The experiments were carried on in such a manner as to imitate the natural conditions as much as possible. Various sorts of pus were dried in pieces of sterilized mull-cloth at room temperature and preserved in sterile glass dishes. After properly drying, which was accomplished at a temperature of 17–20° C., in ten to twenty-two

<sup>1</sup> Bockhardt, Monatshefte für prakt. Dermatologie, IV, 1887, Nr. 10.

<sup>2</sup> Travel, Korrespondenzblatt für Schw. Aerzte, 1892, Nr. 13 u. 14.

<sup>3</sup> Austgarten u. Mannaberg, Vierteljahrsschr. für Dermat. und Syphilis, 1887.

<sup>4</sup> Münchner Med. Wochenschrift, 1886, Nr. 51 u. 52.

<sup>5</sup> Fürbringer, Untersuchungen und Vorschriften über die Disinfection, etc., Wiesbaden, 1888, Bergmann.

<sup>6</sup> Süßbert, Biolog. Spaltpilzuntersuchungen: der Staph. pyog. aur., Wurzbl., 1886, Stahl.

hours, small portions of the crusts were rubbed to a powder and placed in sterile glass dishes.

The investigations of the vitality of these preparations were at first made every other day; then every fourth day; after two weeks they were made weekly; and after four weeks every fourteen days, in the following manner:

(1) From the pulverized pus dust small quantities were blown into the air in such a way as to fall on Petri's dishes covered with gelatine and agar.

(2) Small pieces of the impregnated mull were cut out with sterilized scissors and placed in bouillon, and on gelatine and agar plates.

Four of the specimens of pus used in the experiments originated as follows:

(1) Abscess of an axillary lymph nodule. Thick, slimy, reddish pus. *Staphylococcus pyogenes aureus*.

(2) Large carbuncle on the nape. Thick, yellow pus. *Staphylococcus pyogenes aureus* and *albus*.

(3) Strumitis in a case of pyæmia. Thin, yellowish-green pus. *Streptococcus pyogenes*.

(4) Deep abscess of the neck. Thin, yellow pus. *Streptococcus pyogenes*.

The streptococci from case 4 perished the soonest. After ten days but a very few of the germs were alive. After fourteen days no development followed their implantation on gelatine or agar plates, but in bouillon, at breeding temperature, the pieces of mull cloth developed colonies. After twenty-eight days all of the attempts at cultivation were fruitless. The streptococci from case 3 survived somewhat longer. After fourteen days agar plates, on which the pus dust fell, showed an immense number of colonies, while on gelatine they were very few. After twenty-eight days no cultures could be made on either gelatine or agar; but in bouillon growths went on after thirty six days. After forty-two days no further development could be demonstrated.

The staphylococci showed in the dry state a greater tenacity. The material from the axillary abscess was pulverized and also dried on mull: and after thirty-five days still retained its normal vitality. Here also growth could be last demonstrated in bouillon; for after fifty-six days attempts to make cultures on agar and gelatine were sterile, but development could be demonstrated in bouillon. At the end of seventy days all attempts at culture were fruitless.

Of all the bacteria the staphylococci from the carbuncle (II) showed the greatest vitality. Those in the pulverized pus were capable of propagating after seventy days, and those dried in the mull cloth retained their vitality after eighty-four and 100 days.

In the four varieties of pus investigated the streptococci retained their vitality in dried material fourteen to thirty-six days, and the staphylococci fifty-six to 100 days.

If spore formation is not observed in cocci the question of their great vital tenacity must be considered. The pus itself forms a slimy, dense, gelatinous covering around the dried germs, which tends to protect them; and it is possibly for this reason that germs in thick pus retain their vitality longer than those occurring in pus in thin consistency. In finely pulverized material the germs perished much quicker than in the crusts, a millimeter of which was dried on the pieces of cloth. Nevertheless they retain their vitality tolerably long even in the form of dust.

It is noteworthy that in bouillon<sup>1</sup> the vitality of these bacteria could be last demonstrated. This is readily explained by the fact that the slimy covering, dried about the germs, is softened and dissolved by the fluid nutrient medium at the breeding temperature, and that a fluid medium is best adapted to completely envelop these particles.

Lastly, these few experiments show that the source of the pus plays an important rôle in the tenacity of the germs.

In view of such vital tenacity in a dried state, the dissemination

<sup>1</sup> Fleischwasserpeptonnährbouillon. Löffler's method with 5 per cent. grape sugar.



of pyogenic cocci in the air is not to be wondered at. The fact of their presence, however, is not always of the same importance. Schimmelbusch reckoned that on a wound of one square decimeter, exposed for half an hour in the clinic, sixty to seventy germs would fall; whereas this wound, if the patient were washed with a liter of Spree water, would come in contact with thirty-seven million of bacteria. This example does not by any means show that the so-called air infection is a *quantité négligable*. It is a very different thing when thirty-seven million germs—mostly non-pathogenic—are washed through a wound, and when a few pathogenic bacteria fall into a wound and are rubbed in with dry sponge material and become adherent.

This "air infection" can really become a "contact infection," and this is perhaps most frequently the case. The important thing is not simply the falling of the germs upon the wound surface; for if the wound were not disturbed, and remained absolutely quiet, the dangers of infection would be almost null, because the germs would either be washed away by the blood or lymph or rendered harmless.

The supposed germ, however, falls into the wound from the air in the dust, or from the hair of the operator and assistants, or from the operating gowns. It is now rubbed in with the instruments, or, what is still more plausible, pressed into the tissue or lymph-stomata with the dry sponge material; and here its development must needs give rise to disturbance. The drying of the wound by perfect hæmostasis, and the use of dry and hydroscopic sponge material, furthers the possibility of this hypothetical air infection.

It may be argued that a single germ can not hold out in the strife against blood serum or cells, or that a single germ is not enough to cause an infection. To the first it may be replied that perhaps the very pressing in of the germ and the wound of the tissues so lowers their natural resisting power as to afford a favorable nidus for germ growth. In an operation wound, even when made with the sharpest knife, the vital energies of the tissues are much reduced, and countless smaller wounds are made by pinching with clamps, forceps,

etc. To the second argument it may be replied that the germ particles of the dust in the air are very rarely a single individual,<sup>1</sup> but are composed of a conglomeration of a greater or lesser number of germs which are found on the larger particles of dust. Of course, it can not be ascertained how many of these germs go to make a colony on the culture plate.

It is not known whether single individuals are capable or not of causing a local or general infection. But when the enormous rate of multiplication of bacteria is taken into consideration it is clear enough how a few or a group of germs, when planted where they meet with no resistance in a favorable soil, can increase so rapidly as to soon give rise to pronounced pathological phenomena.

It cannot be said that in every case of wound infection some evident local disturbance must follow in the course of a few days. Such sequelæ belong only to the more severe cases of infection. A slight elevation of temperature may indicate an abortive general infection; and a slight redness of the edges of the wound, disappearing after a few days, pain in the wound, etc., are the signs of a local infection which has been overcome without further disturbances. It simply means that the organism has won the upper hand over the bacterial invasion. Does not infection take place slowly and in immeasurable stages? Is not the first thing observed really the last stages—suppuration and severe general disturbances? Under what circumstances does infection generally occur?

These and many others are open questions, and our knowledge of these vital things is so incomplete that such questions will, perhaps, for a long time remain unsolved. It remains again to be emphasized that, notwithstanding the richness in germs of the air of our sick rooms and operating theatres, an infection from this source is but a small factor in the number of dangers of wound infection. Still, it is a factor which must always be taken into account.

Finally, two sets of rules may be laid down as conclusions from the above observations: (1) those which shall hinder the harmful

<sup>1</sup> Hesse and Petri. *L. c.*

effects of the dust or eliminate it, and (2) those which shall prevent the conversion of infectious material into dust.

(1) The dangers of wound infection from the dust in the air are the greatest in the operating room, because there the most wounds are opened for the deposit of dust, and there the wounds are in a fresh state and not protected by granulations.

The spray which was first used to combat these dangers has passed into desuetude. The moistening of the air by means of steam or spray was next employed, and it was found that an air laden with moisture contained fewer germs than dry air. This is because the germs suspended in the air are carried to the floor by the drops of water, and because the dampness of the floor prevents more dust from arising. Fischer observed that the air at sea 120 miles from the land was free from germs. The artificial induction of dampness of the air is worthy of consideration, and in this line Haegler has carried out a series of experiments. Repeated observations were made by exposing culture plates in the operating room when the air was dampened by a cloud of steam, and comparing the results with those obtained in the dry air. The experiments showed decidedly that in closed rooms the thorough moistening of the air has a purifying effect just as has the rain out of doors. Mikulicz drew a comparison between the spray and the rain; and to show the harmful effect of the former, he said that "every housewife in the country knows that the first rain water soon begins to putrefy," because the rain carries down out of the air a great many germs. Rydygier observed that only the first rain water was thus prone to become putrid, and that the following was just so much freer from germs. He also stated that the spray may be employed to advantage if it is put in operation for some time before the operation is begun. And after his elaborate series of experiments it may be concluded that a thorough dampening of the air with steam removes almost completely, in a very short time, all of the germs; and by a moistening of the floor, walls and apparatus in the room the further formation of dust is prevented.

The time required in precipitating the bacteria from the air

varies with the intensity of the steam. If the room can be filled with steam from the steam pipes in a very short time the air can be quickly purified. It is not a question of antiseptis or of the Listerian spray, but a simple moistening of the air. The idea that infection of the air of a closed room can come from the expired air of the operators and spectators has met with abundant refutation.

(2) The principles which shall prevent the infectious materials from being converted into dust are especially worthy of consideration.

The most important source of infection in sick rooms is the dust, and especially that which lies loosely on the floor, walls and furniture, and waits for a slight motion of the air to pick it up and carry it away.

Before the removal of a dressing the greatest amount of quiet should have prevailed. Everything required in the operation should have been arranged. Especial care must be taken in removing dry dressings from infected wounds, for it must be borne in mind that there is danger of disseminating infectious material into the environs. The incrustrated pus may be dampened, and this also makes the removal of the dressing easier for the patient.

If the dressings and sponge materials are thrown into open vessels or pus basins, and allowed for a time to lie about, the pulverization of infectious material is encouraged. It is best, therefore, to place the dressings in a closed receptacle, the bottom of which is covered with an antiseptic or aseptic solution. Later, the materials should be burned.

If possible, when a wound in a ward becomes infected, the patient should be removed from the aseptic department to some room for the purpose of isolation of infected wounds. This is a principle which has already become quite generally accepted.

In the morning, before the patients arise, the dust, which has had a chance to settle during the night, should be mopped up from the floor, furniture, and possibly from the walls, with a wet cloth. Parquet floors are not injured by this frequent dampening. They should be oiled weekly with a mixture of turpentine and petroleum in equal parts.

In the operating room, the above principles are of the greatest importance. Above all, the dust on the floor, wall, etc., is to be regarded as a source of infection. The dissemination of this dust can be, in a measure, prevented by the use of steam; that is, by dampening the whole interior surface of the room. The operator and assistants should also give careful attention to the hair and beards. They should be either wet or oiled. The operating gowns should be moistened. This is usually accomplished in the sterilizer.

The above procedures may seem complicated and difficult, but this is not the case. They demand no great expenditure of time or material, but only a little more care.

JAMES P. WARBASSE.

#### POSTNIKOW ON GASTROENTEROSTOMY IN TWO STAGES.<sup>1</sup>

IN the year 1881, A. Wölfer published a paper on the subject of establishing a fistula between the stomach and intestine, gastroenterostomy, which he had been the first to accomplish.<sup>2</sup> It was in the case of an inoperable, stenosing, carcinoma of the pylorus. Since then more than ten years have passed; but, although there are plenty of opportunities for performing the operation, the indications for the same have ever remained limited. It seems that, in more recent times, the tendency is growing stronger to discard the dangerous operation of pylorotomy for carcinoma pylori, excepting in distinctly operable cases, and to give the preference to the gastroenterostomy. This seems to be justified by the very much lesser mortality of the gastroenterostomy.

In the endeavor to lessen the death rate, and to reduce, as much as possible, the danger of this valuable palliative measure, Postnikow has performed a series of experiments upon dogs, with the view of proposing certain modifications in the carrying out of the operation.

<sup>1</sup> *Centralblatt für Chirurgie.* No. 49, 1892.

<sup>2</sup> *Centralblatt für Chirurgie.* No. 45, 1881.

It is not necessary to give here the technique of the operation, which has been employed for a long time in such investigations, as published by Rockwitz.<sup>1</sup>

The modification of Postnikow is quite as applicable to the method of Wölfer as to the methods of Courvoisier and Hacker. It consists in that the incision is not carried through the entire thickness of the stomach and intestinal walls. The steps of the operation are as follows: (1) Abdominal section; (2) drawing out the loop of intestine and suturing it, serosa to serosa, to the stomach; (3) cutting out of the stomach wall a small oval as far down as the muscularis, and the same on the intestine; (4) uniting by sutures the posterior

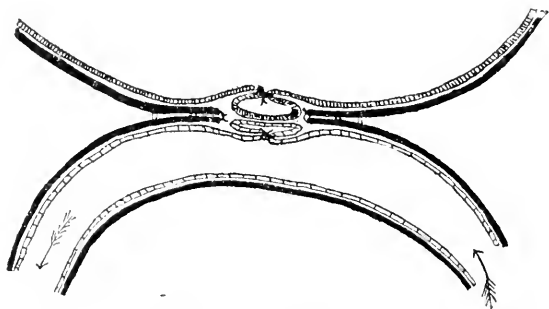


FIG. 1.—Showing Denuded Mucosa of Stomach and of Intestine Strangulated by Purse-string Ligature, while Serous Surfaces are Attached by Sutures.

borders of the two wounds; (5) placing a silk ligature around the mucous membrane of the stomach, which presents through the oval opening, and another around the mucous membrane of the intestine free from serosa; (6) uniting by sutures the anterior borders of the two wounds; (7) a second row of serosa-serosa sutures near the last; (8) closure of the belly wound.

The above modification differs from the typical gastroenterostomy only in the fifth step. In this the mucous membranes of the stomach and intestine are not incised, but are ligated by a strong silk thread, which causes necrosis of the ligated portion, which falls away on the third or fourth day. Then is first established the communication

<sup>1</sup> Deutsche Zeitschrift für Chirurgie, Bd. xxv.

between the stomach and gut, which constitutes the second stage of the operation.

A detailed description of these experiments, seventeen in all, which were carried out in the pathological institute of the University of Moscow, under the direction of Prof. A. Fogt, has not yet been published. It is the present intention simply to set forth the advantages of the procedure; and the following may be called attention to: (1) The escape of stomach and intestinal contents into the peritonæum is almost impossible. The operation can, therefore, be aseptically carried out. (2) With the above modification, the operation is more rapidly performed. This alone is a very important feature for the prognosis. Sixteen to twenty interrupted sutures suffice; or, what is

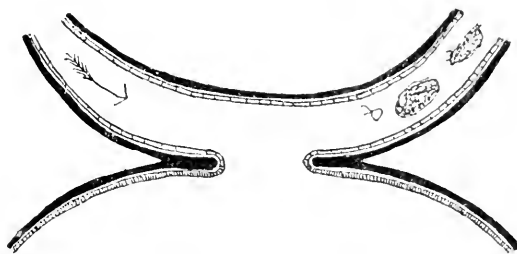


FIG. 2.—The Strangulated Mucosa have Separated and the Fistula is Completed.

applied still quicker, the *sutura continua rara* may be employed. The application of the sutures can be done less carefully, inasmuch as the mucous membrane is not perforated until after the first two or three days; and this is sufficient time for firm adhesion to take place between the stomach and the intestine. (3) Washing out of the stomach may be omitted in the case of a feeble patient on the day of the operation, which, notwithstanding that he is accustomed to it, costs him so much needed strength. The operation is accomplished *tuto, cito et jucunde*. As to the technique itself, it is simpler than that in the typical gastroenterostomy.

The animals subjected to experiment rapidly recovered, and took nourishment at the end of the first day. Haemorrhage was never observed at the time the mucous membrane came away. Nor has

cicatricial stenosis been observed in the animals which were allowed to live from 44 to 100 days. In closing, it may be emphasized that in the endeavor to reduce to a minimum the percentage of mortality in this palliative operation, the aim is to replace by the gastroenterostomy in the most cases, as much as possible, the dangerous and not radical pylorotomy.

JAMES P. WARBASSE.

### THE PRESENT STATE OF KNOWLEDGE AS TO CARCINOMA.

CARCINOMA is the most frequent tumor found in the human body, as well as the most fatal. The points to be considered, from the standpoint of the practical surgeon, in connection with the subject, relate mainly to the cause of the disease, its prognosis and treatment.

The question of the origin of carcinoma through the medium of a specific micro-organism is one of great interest and practical importance. More than a century ago the question was raised of the transferability of the disease. In the light of now well-demonstrated facts concerning the origin of tuberculosis, syphilis and leprosy, the subject of the analogy existing in this respect between these diseases and carcinoma has been vigorously agitated. The resemblances between the first named and the disease under discussion are striking. In both, a strictly local origin of the tumor is observed, occurring in almost every part of the body. Then a preference to some extent for certain regions is observed in both, as well as the occurrence of secondary growths in distant parts through the medium of the lymph channels and lymphatic glands. It is not to be supposed that this can occur from the propagation of the secretions of the tumor or the so-called cancer juice, or from any chemical poison. It is improbable that this could possess the power of infecting alike tissues of such widely-varying characteristics, and in such distant parts. Skin and glands, connective tissue and bone, all show, when attacked, the same peculiar cell structure found in the primary focus.



Histological studies have demonstrated the fact that not only the liquid but the cellular portions of the tumor find their way into the lymph channels and lodge in the lymphatic glands, in which latter situation secondary nodules develop, this being followed, in its turn, by breaking down of the glands, and the direct passage thereafter of the infectious agents into the general circulation.

While it is not difficult to understand the method of transference of these cellular elements from one portion of the body to another, the question still remains, How do these obtain the power of proliferating or of establishing a new colony, the atypical growth of which either forces the surrounding tissues to take part or suffer destruction? It may be said in reply to this, that normal epithelial structures, when transplanted, immediately take on growth, as shown in certain plastic operations, and that transplantation of muscle, nerve and bone is now an accomplished fact. This is true, but these never exceed the normal limits of growth; tumor is never produced as a result of such transplantation. If a proliferation occurs in excess of the requirements of repair, as, for instance, the formation of callus after bone transplantation, this is quickly absorbed. It is, therefore, reasonable to suppose that a specific infectious agent exists in carcinoma, and that this is disseminated, accompanied or otherwise, by the cellular elements of the original neoplasm, through the lymph channels or blood-vessels. The identification of these with micro-organisms in the near future is highly probable, as well as the demonstration of the manner in which these infect the cells. It may be said, in passing, that Virchow held that the influence which affected the cells was similar to the action of the spermatozoa upon the ovum.

The attempt to prove that such specific agents existed by demonstrating the contagiousness of malignant growths has always given but indifferent results, and the data derived from these experiments are therefore unreliable. The experiments of von Langenbeck are well known. The injection of fluid from a recently removed cancerous growth into the circulation of a dog was followed by the occurrence of a carcinomatous nodule in the lung of the animal. A number of

experimenters followed this attempt, some of whom obtained positive, while in others only negative results followed. One fact, however, is noticeable: while those who employed material obtained directly from the patient, or from a recently removed growth, and at the same time secured primary union in the inoculation wound, succeeded the most frequently, on the other hand, those who employed material taken from the dead body, or in whose hands the inoculation wound suppurated, recorded the largest relative number of failures.

In addition to these experimental studies, clinical observation at least suggests the possibility of the disease being transported from one person to another. Munde, Macewen, Parry and others, during the past decade have communicated cases which seemed to prove that an attendant could be infected with the disease, and that the husband could be infected upon the penis from uterine cancer in the wife.

The subject of the contagiousness of carcinoma is receiving a more than usual amount of attention at the present time. Guelliott, a French observer, has made a most careful study of the entire question during the past year and brings forward some extraordinary facts which seem, upon examination, to point to the great probability of the contagious nature of the disease.<sup>1</sup>

As to the predisposing causes: At the present time it is believed that these, save those referable to age and local conditions, have very slight influence in the production of the disease. The causes assigned by the older writers, namely, malnutrition, grief, heredity, etc., are now scarcely considered of sufficient importance to enter into the question at all; in point of fact, the experience of competent observers suggests that the first-named condition rather favors resistance to the disease, both in its onset and subsequent course.

It is a well-known fact that epithelial carcinoma selects, by preference, the natural outlets of the body, and particularly narrowed portions of canals lined with mucous membrane. It is a question worthy of consideration whether this is not due to the fact that these points are more exposed to injury, and furnish ready means of access

<sup>1</sup> Samuel Lloyd, in *ANNALS OF SURGERY*, February, 1893.

for specific irritating or infectious agents. And may it not likewise be true that the occurrence of carcinoma at the site of lupus and leg ulcers may be accounted for in the same manner?

Predisposition, based upon chronic influences, is to be assigned a place in the consideration of the etiology of carcinoma. Its frequent occurrence upon the scrotum in chimney-sweeps, paraffin workers, and others on whom soot accumulates, and in whom a chronic eczema precedes the development of the disease, is well known. The epithelioma of the smoker's lip is another familiar illustration of the influence of chronic irritation.

Physiological activity has been considered as one of the predisposing causes of carcinoma, particularly in the disease as it attacks the mamma (Sprengel, of Dresden). It may be suggested that excessive lactation only leads to greater frequency of the disease, because of the greater opportunity afforded for the entrance of specific infection through the fissured nipples, to which nursing women are subject.

The persistence of embryonal conditions has long been recognized as the origin of certain tumors of undoubted congenital character, such as capillary angioma and dermoid cysts. Cohnheim undertook to establish a generalization of tumor pathology which should account for malignant diseases, and particularly carcinoma, upon the basis of a fetal origin of the atypical proliferative process. Even should this view ultimately prevail, it still leaves unanswered the question as to what influences are brought to bear by means of which the development of embryonal tissue is accomplished after remaining latent for years.

In the further consideration of the probability of some specific influence, acting as the immediate cause of the disease under discussion, may be mentioned the fact that during the first decade of life the congenital type of tumor is almost exclusively observed; during the second decade, those based upon an atypical proliferation of connective tissue elements (sarcoma), particularly those which attack the medullary structure of bone and the periosteum are the most prominent. These latter may continue to appear in the third as well

as the fourth, but during the fourth and fifth decades of life these growths attack principally the soft parts, rather than the osseous structures (sarcoma of the mamma, testicle, muscles of the thigh, etc.). On the other hand, carcinoma is comparatively rare in the first three decades, although exceptionally it may occur within the third. It therefore must be apparent at a glance that, if both of these classes of neoplasms depend for their origin upon the undue development of embryonal tissue, there must exist some specific influence in the case of each, which leads to a connective tissue proliferation at the expense of the epithelial structures, and occurring at an early period of life on the one hand, or an atypical epithelial proliferation at the expense of the connective tissue elements occurring later in life, on the other. Thiersch's ingeniously devised theory of the battle of the cells cannot meet the requirements.

The importance attributed by the laity, as well as the profession, to heredity is probably very much exaggerated, if, in point of fact, it possesses any influence whatever. Here, as in tuberculosis, an inherited constitutional weakness or want of resistance on the part of the tissues may enter into the consideration, but the existence of a hereditary specific predisposition is not only much doubted, but positively denied. Even if this be granted, as well as the theory of Cohnheim, that this may consist of a collection of epithelial or connective tissue elements in an imperfectly developed fetal state, yet we are as far as ever from any knowledge as to what especially irritating influences govern their proliferation.

Further, the question of so-called malignant metamorphosis has a bearing upon the matter in hand. It is admitted that, under certain circumstances, the growth arising from connective tissue elements, originally of a benign character, may after extirpation recur, and in a form which leaves no doubt that they are the result of atypical development, and hence malignant. In this manner a fibro-sarcoma may follow a simple fibroma, or sarcoma develop from an enchondroma. But such a thing as the metamorphosis of a connective-tissue type of tumor into one of the epithelial type is unknown. The

probable existence of a specific irritant, and that probably a micro-organism, explains, more completely than any other theory, this supposed malignant metamorphosis.

Another circumstance bearing out the analogy of carcinoma to tuberculosis is the tendency of the former, like the latter, to involve neighboring structures, as well as the facility with which the disease is transferred from its original focus to lymphatic glands through the lymph channels. In all probability this infection occurs through the medium of the carcinoma cells, which possess, according to Waldeyer, peculiar contractile as well as migrating properties, and in this manner secondary foci are produced. A peculiar preference is shown by carcinoma for propagation through the lymphatic system. Local growth occurs by infection and invasion of the immediately adjacent lymph channels. This analogous method of dissemination still further suggests the probability that carcinoma, like tuberculosis, is the result of the action of a specific micro-organism.

Propagation by auto-inoculation has likewise been observed. Instances of infection from one vocal cord to that of the opposite side are recorded, as well as carcinoma of the cheek at a point opposite to a similar growth upon the tongue. Contact infection is likewise observed in those cases in which the parietal peritonæum becomes involved secondarily to carcinoma of the liver, or in which the latter occurs following carcinoma of the adjacent transverse colon. The extensive dissemination sometimes observed in the peritoneal cavity, as secondary to a primary focus in a loop of intestine, and which, by constant changes of position of the bowel is brought in contact with new points, can only be explained in this manner.

The theory of a specific micro-organism, although not yet fully confirmed, is the only one at all approaching probability. Rappani, and later Scheurlen, believed that they had discovered a specific microbe, but other observers have failed to confirm this. Recent researches, however, seem to have shown the presence of certain micro-organisms in carcinomatous growths belonging to the class of sporozoa or coccidia. These consist of low protistan organisms, which are

rather frequently found parasitic in man and other vertebrate animals, in which they occupy the skin and intestinal tract. The muscles and blood may likewise contain them, and in two diseases, at least, they are present, namely, molluscum contagiosum and that form of papillary dermatitis which occasionally precedes the development of carcinoma of the mamma (Paget's disease of the areola). These protozoa-like parasites, in their relation to carcinoma were first described by Pfeiffer, of Jena, in 1888, who demonstrated their presence in the cells of recently removed melanotic carcinoma. He likewise suggested that different parasites exist in different varieties of carcinoma. The fact of their presence has recently claimed to have been demonstrated by Podwysoski and Sawtschenko, as well as by Plimmer and Jackson Clarke. The former observers claimed that they had discovered certain falciform bodies which represented stages in the development of the carcinoma parasite. Ohlmacher, at the last meeting of the Pathological Section of the Chicago Academy of Sciences, in pointing out the liability to form wrong conclusions from the appearances produced by the use of some of the rapidly multiplying new micro-technical procedures, particularly those involving the use of safranin and iodine and safranin and picric acid alcohol, calls attention to the studies of Podwysoski and Sawtschenko, and claims that the falciform and other bodies described by these observers are artificial products due to the use of safranin and iodine or safranin and picric acid in the staining process. Whether or not these sporozoa are the essential specific infecting agents of carcinoma remains to be demonstrated. They may only occur in the course of cell formation or degeneration, and hold but a casual relation to the disease. Their position as etiological factors may possibly be determined by the results of inoculation experiments upon lower animals with pure cultures of the micro-organisms obtained from pure carcinoma, although, according to Jackson Clarke, the sporozoa of carcinoma are more closely related to the hæmatozoa than to the coccidia. Since one stage of their existence is passed in the interior of the cell of another animal, it will not be easy to make artificial cultures of them.

Some very suggestive observations have been made bearing upon this subject by Metschnikoff. He describes a disease occurring in rabbits known as coccidiosis, which is characterized by the presence of coccidia or sporozoa. It consists of nodules found in the liver of the animals, the peculiar and essential characteristic pathological feature of which is an atypical proliferation of epithelial cells, quite analogous to that found in carcinoma in man. This, taken in connection with the demonstrated presence of coccidia in carcinoma, and the fact that the number of the parasites, as found in the latter disease, bears some relation to the malignancy of the type, they being more abundant in medullary growths and but sparingly present in those less disposed to recurrence, and hence less malignant, such as epithelial carcinoma of the face, presents, to say the least, food for reflection, and an incentive to further investigation. The isolation of the specific micro-organism of carcinoma, as well as of sarcoma, and a study of the entire question from the standpoint of the bacteriologist, hold out a far greater hope, at the present time, than any other method of investigation.

There are some interesting and important points relating to the prognosis of carcinoma which might be profitably dwelt upon, but which can only be alluded to briefly here. That the disease is a most distressing one from every standpoint is true beyond a doubt. The prognosis is exceedingly unfavorable for three reasons: (1) Because of the local destruction of tissue; (2) because of the final invasion of the entire organism; (3) for the reason that, even when apparently radically extirpated, recurrence is the rule, and not the exception.

The proportion of cases in which recurrence takes place will vary with the character of the growth, its accessibility to radical operative interference, and the period of the disease which has been reached prior to the operation. The kind of recurrence, whether regionary or dyscrasial, will also be governed, to some extent, by these considerations. In carcinoma of the lip and of the mamma, for instance, owing to the accessibility of the growth, as well as its lymphatic sequelæ, its ready recognition and hence more frequent early and radical extirpa-

tion, recurrence is not to be anticipated in as large a proportion of cases as is observed in growths situated elsewhere. For the same reasons recurrences following the class of cases just cited are more apt to be dyscrasial than regionary. Again, separating those of the lip, which are epitheliomatous in character, from those of the breast, which belong to the glandular variety, it is found that recurrences, both regionary and dyscrasial, are more frequent in the latter than in the former. It is likewise a well-known fact that locality has considerable influence in determining the question of recurrence. For instance, the disease, as it attacks the lips, cheeks, face and nose, is far less prone to lead to recurrence than in other situations, such as the tongue and larynx. It therefore may be said, in estimating the expectancy of life in a carcinomatous patient, that this will depend upon the malignancy of the disease, this being based upon the rapidity of its growth, if not operated upon, and the probability of its return, based upon its location and the stage of the disease reached before extirpation was advised or permitted. In regard to the latter it may be further stated that, while very early operation cannot positively insure against recurrence, on the one hand, on the other some cases have undoubtedly occurred in which operative interference has been postponed until after lymphatic glandular involvement had taken place, and yet no recurrence followed. Still, it is the experience of surgeons that early and radical extirpation of the primary focus holds out the most promising hope of cure. Not only this, but the dangers of the operation itself are very much lessened by adopting this course. In former times the growth was looked upon as the local expression of a general disease, and as a consequence the necessity for urging early removal not appreciated. At the present time, however, the diseased focus is looked upon as being locally restricted, and recurrences are not regarded as the result of a dyscrasia which existed from the beginning, but rather as evidence that the operation was undertaken too late, or was not sufficiently radical.

While every reasonable effort to effect a radical removal should be countenanced and encouraged, yet there will always remain a class



of cases the exigencies of which demand the application of palliative measures only. This is more particularly true of certain rapidly proliferating growths within the cavity of the uterus, upon the vaginal wall, etc. Here hemorrhage and the constant presence of offensive discharge may temporarily, at least, be abolished by the use of the curette and thorough cauterization subsequently.

Experience teaches us that early enucleation by the knife in primary growths, and prompt and thorough removal of secondary deposits, and recurrences give the most satisfactory results. Although this is contrary to the general opinion held, yet the argument is altogether in favor of the attempt to rid the patient of the disease. In my own experience, nearly a year of life was gained, on an average, among those operated upon for carcinoma of the breast, as compared to those not operated upon.

A word as to methods of treatment of a non-operative character. Intra-parenchymatous injections of tincture of iodine, nitric acid, ozone water, and, more recently, of the solutions of the aniline coal-tar products, methyl-violet and carmine, etc. (Mosetig-Moorhof), have been tried. With the possible exception of the last named, there can nothing be said in favor of these procedures; the originator of this latter does not claim that a single case has been cured by it, and one observer (Le Dentu) declares that in a series of cases in which he tried it, in the majority the growth of the neoplasm was hastened.

The treatment of inoperable cases of carcinoma by means of inoculations of pure cultures of the streptococcus pyogenes of erysipelas has been recommended by P. Bruns. The method is not devoid of danger, and fatal results have been reported as being due to the inoculation, by Feichenfeld. The objection to the employment of such means consists in the very great undesirability of producing conditions in which the element of danger enters very largely, and which may pass completely beyond the control of the surgeon.

The destruction of the neoplasm by means of caustic paste has been attempted for many years past. These attempts have never gained the confidence of the profession, this being due in part, at

least, to the fact that the method has been to a great extent employed by irregular practitioners and ignorant quacks. The employment of the method by intelligent and conscientious members of our profession can only determine the precise value to be attached to the use of caustics in the treatment of carcinoma.

The use of internal medication in the treatment of carcinoma deserves a passing notice. If by this term, however, is meant such specific medication as will influence the course of the disease favorably, it can only be said that such has not as yet been discovered. The powdered oyster shells, cundurango, chloride of bromine, Chian turpentine and arsenic of modern times, have been found to be just about as efficacious as the roasted lizards and amulets of the ancients.

The remedy, above all others most useful internally, is that given solely and entirely for the relief of pain, namely, opium. When this has been said all has been said which can, in the present state of our knowledge, be deemed apropos of the internal use of medicines in the treatment of carcinoma.

GEORGE RYERSON FOWLER.

## INDEX OF SURGICAL PROGRESS.

### HEAD AND NECK.

**I. The "String" Method of Dividing Œsophageal Strictures.** By ROBERT ABBE, M.D., New York. The author relates a case of dense, narrow stricture of the œsophagus near its cardiac end, in which, after having opened the œsophagus near the root of the neck and the stomach by the usual gastrotomy incision, he was finally able to pass a very fine conical gum-elastic bougie upward through the stricture; to the end of this bougie he tied a piece of heavy braided silk, and drew it through the canal. By pulling this string back and forth, in see-saw manner, over the distended stricture, these tissues were gradually and rapidly divided, so that enlarging bougies were quickly able to pass with ease until the normal calibre of the œsophagus was restored. After the dilatation he drew a rubber tube the size of one's finger through the stomach up into the œsophagus to a point higher than the stricture and left it in situ, its end projecting through the gastrostomy opening below for some days, while nutrition was maintained by the introduction of food into the stomach through a second tube. No accident marred the progressive recovery of this patient. At the end of a week a second free dilatation under ether and with the aid of the string was done: the largest sized bougie freely enters the stomach; the œsophageal fistula in the neck closed spontaneously in two weeks; the gastric fistula was closed by a plastic operation after eight weeks. He sums up as follows:

The operation for impermeable or very tight stricture is best undertaken as follows: Gastrotomy is done by the oblique incision along the margin of the costal cartilages. Digital examination of the œsophageal orifice is made and a small, conical, gum-elastic bougie guided into it by the finger. If dilatation is easy, larger bougies are

to be used, but if resistance is great force is dangerous. The smallest bougie is then to be made to carry a heavy braided ligature silk from the stomach to the mouth. A larger bougie is now passed from the stomach alongside the string and pressed tightly into the stricture, so as to stretch it. The string is now drawn upward by the fingers introduced well back in the mouth, and the bougie will be felt to advance at once as the string wears away the tense stricture. Larger bougies are now pressed in and the string see-sawed back and forth. When the largest size has been attained a corresponding rubber tube is drawn up the œsophagus past the point of stricture, its lower end remaining outside the stomach wound. A smaller tube is introduced into the stomach for nourishment. The patient can thus drink water for refreshing the mouth, or swallow saliva without contaminating the wounded surface, which the tube also serves to keep dilated. The large tube may be removed the second or third day, and dilating bougies introduced from the mouth after the fourth day. The gastrostomy wound may be closed by a plastic operation whenever the patient has gained strength.—*Medical Record*, February 25, 1893.

**II. The Closure of Cut Throat and Surgical Wounds of the Air Passage by Immediate Suture.** By HENRY MORRIS, M.B., LOND. (London). The author departs from the approved methods of leaving cut throat wounds to heal by granulation and cicatrization, and seeks by the liberal employment of buried and superficial aseptic sutures to bring about immediate union. He takes great care, after thoroughly cleansing all the parts about the wound, to unite accurately, end to end, the cut edges of each structure which has been divided—cartilage with cartilage, membrane with membrane, muscle with muscle, fascia with fascia and skin with skin. He also inserts a few pieces of drainage tube at selected points of the wound, and by these means provides against the sources of danger ordinarily attributed to immediate suture, such as suffocation from recurrent hemorrhage or purulent discharges into the air passages, inflammation and œdema of the neighboring parts, dyspnoea from the collection of

viscid mucus, which cannot be expelled through the wound, and emphysema.

He reports three cases in illustration of his method, all of which were successful, recovery ensuing in all but one, in which an insane subject reopened his own wound.

He dwells upon the necessity of securely fixing the head and steadying the neck during the healing of these wounds after closure by suture, and summarizes the advantages of his method as follows :

(1) The cut edges of each structure being brought into exact apposition, and so retained by the sutures, union by first intention is secured.

(2) This rapidity of union allows of rectal feeding being employed up to the time the patient can swallow naturally.

(3) The distress caused by feeding three or four times a day, through a tube passed into the pharynx or œsophagus, is thereby avoided.

(4) The prevention of painful or distressful attempts at swallowing, attended by the escape of the fluid at the wound, and the excitement of troublesome spasmodic cough.

(5) The prevention of the great risk of contraction or stricture of the air passage or food passage so likely to follow when the wounds have been allowed to heal by granulation.

(6) The prevention of a temporary or permanent fistula opening into the air or food passage.

(7) The avoidance of an *alleged* danger in cases where the epiglottis is cut through, viz., of suffocation from the detached portion of the epiglottis falling over the upper aperture of the larynx.—*London Lancet*, December 24, 1892.

JAMES E. PILCHER (U. S. Army).

## BONES-JOINTS, ORTHOPÆDIC.

**I. The Later Results of Laminectomy for Paraplegia Due to Angular Curvature.** By W. ARBUTHNOT LANE, M.S. (London). Of eleven cases operated on two terminated fatally.

CASE I was an extremely feeble, pallid child, aged five and a half years, who died a few hours after the operation. In this case the bodies of several vertebræ were very extensively diseased, and the amount of blood lost at the time of the operation, though very slight in quantity, was yet, when added to the exhaustion resulting from the chloroform, sufficient to kill the child.

This was the only one of the eleven cases in which death or any evil result whatever was consequent upon the operation.

CASE II.—The fatal termination in the second case had no causal relationship whatever with the operation, but resulted six whole days after it from a sudden and excessive hæmorrhage from a polypus of the rectum; this appeared to have been started by the administration of a teaspoonful of compound licorice powder the night before.

Two other cases were unsuccessful, being only temporarily and partly benefited by operative interference.

CASE III.—W. S., aged sixteen, had very extensive disease of the dorsal spine, from which he had suffered for a long time. He had had marked paraplegia for six months, and when operated on this was complete. The spinal cord was exposed on three separate occasions within a period of fourteen or fifteen months, and large quantities of tuberculous material and carious bone were removed. On the third occasion large pieces of dead bone, as large as the end of the finger, were taken out of the cavity below the cord. Some benefit was derived from each operation, but the steady and comparatively rapid progress of the disease soon obliterated the advantage gained. He died later from pneumonia, probably complicating influenza, with which his paralyzed condition rendered him quite unable to cope successfully.

CASE IV.—J. M., a lad, aged seventeen, gave only a month's history of progressive paraplegia. At the operation the posterior surface of the bodies of three or four dorsal vertebræ were found to be deeply infiltrated by tuberculous material, a quantity of caseous material compressing the cord. He improved after the first operation, but

as a relapse of his original symptoms took place, another and a more extensive operation was performed. An abscess was then found in the right side of the chest, and the bodies of the vertebrae were found to be more deeply involved than was suspected at the first exploration. He improved but slightly on this occasion, and soon relapsed. He refused any further active interference, and though the treatment by recumbency was continued he did not improve. I have been unable to find him, as his parents have changed their address, so cannot report as to his present condition.

CASE V.—H. S., a boy, who gave eleven months' history of paraplegia, with more or less incontinence of urine and faeces, was apparently sinking rapidly from pulmonary complications, was operated on in February, 1890. He rapidly lost his paraplegic symptoms and gained in health and strength, his cough also disappearing. He now leads a very active life, having had no recurrence of his paraplegic or spinal symptoms, the tuberculous disease being apparently cured.

CASE VI.—H. M., aged thirty-two, gave about three weeks' history of progressive paraplegia, which, while he was treated by recumbency alone, rapidly became almost, if not quite, complete. He was operated on in May, 1890: an abscess was opened, and much tuberculous material removed. He gained complete power over his legs, and since the operation has had no return of paraplegic symptoms. The spinal disease is apparently cured. He says it is only after he has walked a considerable distance that he feels any weakness in his back.

CASE VII.—K. B., aged twenty-one, gave more than nine months' history of paraplegia, which had been complete for some considerable time before her admission. She had also a disorganized knee-joint. She was extremely feeble physically. On November 5, 1890, she was operated on, and in a remarkably short space of time all symptoms of paraplegia had disappeared. The knee was excised on November 30. After the first operation complete paraplegia and cystitis developed very rapidly, and a second operation

was performed. On this occasion a considerable quantity of pus and caseous material was evacuated, when she recovered as rapidly as she had done before. The excised knee did well. I heard from Dr. Bernard Scott, whose patient she was, that she died of influenza about eight months after she left the hospital, and that she had had no recurrence of the paraplegic symptoms, nor had she any trouble in her back or knee.

CASE VIII.—A. T., aged seven, gave six weeks' history of rapidly progressive paraplegia, which became almost complete, sensation being much impaired. He was operated on February 10, 1891, a large abscess which compressed the cord anteriorly being opened, cleansed and filled with iodoform. He recovered rapidly and completely, and now leads as active a life as a boy with so marked a deformity can. The angular curve is now apparently firmly ankylosed, and free from disease.

CASE IX.—S. T., aged twenty-three, a very delicate man, had paraplegia five years before admission, and recovered after fifteen months' recumbency. Three months before admission paraplegia steadily returned. He was operated on in July, 1891, when a large abscess extending well into the chest, the walls being formed by bone, was exposed and evacuated. It was obvious that this abscess had existed since the first attack of paraplegia. He has now regained control over his legs and can walk about, though not for very long distances. He is troubled by a slight purulent discharge from an abscess which formed in the loin, the spinal trouble being in the mid-dorsal region. This discomfort will, I hope, be removed during the next few months. He has gained in strength, but has a suspicious condition of the apex of one lung.

CASE X.—E. R., aged eight, a feeble, deformed child, rapidly developed paraplegia, which appeared three weeks before the operation, and became almost complete. The spinal canal was opened on May 2, 1891, when extensive caries and necrosis of the bodies of two or more vertebrae were found. He soon recovered power over his legs, and led as active a life as his deformity permitted. Recently a



sinus has formed in the vicinity of the cicatrix, and some pus discharges daily from it. It improves rapidly under treatment and will, I have no doubt, close shortly. He has had no return of the paralytic symptoms.

CASE XI.—W. H. W., a very delicate, deformed boy, seven years of age, gave five weeks' history of paraplegia, which developed more or less suddenly, and was accompanied by imperfect control over the sphincters. He was operated on in April, 1891, when extensive disease of the bodies of two or three vertebræ was found. He recovered rapidly. He now leads an active life, has had no return of the paralytic symptoms, and the spinal disease is apparently cured.

The author recommends operating on these cases as early as possible, if a short period of recumbency is not followed by definite improvement.

The operation in no way interferes with the treatment by recumbency, the latter being a necessary consequence of the former in order that the spine may ankylose firmly. If a case does not recover with operative treatment and recumbency, it obviously will not recover if treated by recumbency alone. He points out that one of the cases had, after fifteen months' recumbency, been cured of his paraplegia: but that it was found on operating on him for a relapse of his symptoms, five years afterward, that the relief of the cord from pressure had been due to an extension of the abscess forward into the chest, where it had acquired a more or less perfect bony wall, and remained latent for five years. The tension within the abscess then increased for some reason or another, and paraplegia again developed. On this occasion the abscess cavity, which was as large as a tangerine orange, was readily and effectually cleared of its contents.—*British Medical Journal*, December 31, 1892.

**II. Passive Congestion in the Conservative Treatment of Tuberculous Joints.** By HERBERT W. PAGE (London). The author describes the method practiced by Bier in Esmarch's clinic at

Kiel. The old observation that passive congestion of the lungs provided or seemed to provide immunity against tubercular infection led to the suggestion that induced congestion of a part might have a like effect. This was done by bandaging the parts above and below the affected joint. If, for example, the elbow joint were affected, the fingers, hand and arm are bandaged up to a point immediately below the articulation, while directly above it the arm is next encircled with an inch-wide elastic band, sufficiently tight to impede but not arrest the circulation, passive congestion of the intervening zone being thus induced. The skin has to be protected from the direct pressure of the elastic band by a piece of lint or bandage beneath it. Splints are wholly unnecessary, and the limb may be used as much as the fact of its imprisonment in bandages will allow. The method is somewhat painful for a day or two in the beginning, but discomfort soon disappears. The author refers to cases of tubercular synovitis of the elbow, tuberculous ulceration of the skin, tuberculous knee joint disease and tuberculous epididymitis. The method is applicable to tuberculosis of the skin and the synovial membranes, but not to disease of the cartilage or bone.—*London Lancet*, November 19, 1892.

**III. Tenotomy by the Open Method for Contracted Knee.** By FREDERICK TREVIS, F.R.C.S. (London). A woman, aged twenty-one, had a contracted knee resulting from tuberculous joint disease of four years' duration. The knee had been at first immobilized for seven months, from which permanent stiffness of the limb resulted; eight months later an abscess formed in the outer part of the popliteal space, ultimately opening and continuing to discharge for six months. A few months later a tuberculous ulcer formed over the outer malleolus and persisted for two years. The author readily relieved this by scraping and grafting. The limb was in the position of semi-flexion, and suspension from bands about the ankles and thigh, with a weight upon the knee, and later the use of a back splint, failed to secure improvement. The author then dissected up a rectangular flap, including the whole integumentary covering of the popliteal space, and divided the tendons of the semi-membranosus

and semi-tendinosus muscles and the ilio-tibial band of the fascia lata; much cicatricial tissue was divided in the hollow of the ham, and this seemed to be the principal cause of the contraction. The limb was fully extended without the application of any force, the wound closed and an anterior splint applied; a back splint was applied later, and still later a plaster splint. The patient was discharged on the forty-third day, able to walk and with a slight amount of motion in the joint. The author remarks that while he still holds to the subcutaneous operation with certain tendons, such as the tendo-Achillis, where the division can readily be made through a small aperture, he now resorts to the open method with other tendons, among which he mentions the sterno-mastoid. He adduces the inflammatory reaction and consequent joint stiffness which would have followed the violent measures necessary to "break down" the adhesions in the present case as a strong reason for using the open method.—*London Lancet*, November 19, 1892.

JAMES E. PILCHER (U. S. Army).

**IV. Two Rare Luxations.** By Dr. HERLOFSEN (Christiana, Norway).

I. *Anterior, External and Incomplete Luxation of the Foot, with Fracture of the Fibula.*—N. R., twenty years of age, was leading an ox by a rope attached to his body. The animal chased and tossed him to the length of the rope, and he fell flat upon the ground. The ankle joint was found quite swollen and enlarged. The foot abducted and inclined toward the fibula and sole. The long axis of the tibia passed downward, inward, backward and by the foot. The articular surface of the astragalus was partially to be felt anterior to the tibia. The external malleolus was with difficulty palpable, and the outer margin of the astragalus was perceptible on the outer side of the external malleolus. Over this point greater sensitiveness to pressure and indistinct crepitus. There was an extensive subcutaneous effusion of blood, especially upon the tibial side. The foot was somewhat passively movable. The dislocation was reduced under narcosis, with exertion of great force, by traction, dorsal and fibular flexion,

one assistant making counter-traction and another pulling downward and backward by means of a hitch around the foot. Dupuytren's splint was not well borne; strips of wood were applied along the leg, cotton around the joint; a circular bandage and ice bags completed the dressing. Eleven days after foot was found slightly flexed toward the fibula, otherwise in a normal position; the extravasation was absorbed; at the end of the internal malleolus there was a sharp and horizontal bony projection; slight swelling around the external malleolus. Joint free from pain on pressure and passive motion. A plaster-of-Paris bandage was applied and removed in six weeks. Complete normal function.

II. *External Vertical Luxation of Patella*.—Miss H. S., seventeen years of age, stopped in the middle of a dance with a cry of pain, and was carried to bed. The left patella was found standing on the inner condyle of the femur, with its articular surface looking inward. It was easily reduced by flexion of the hip joint, over-extension of the knee joint and manipulation of the patella. The method by which it originated is interesting. It took place during a dance, performed in the ordinary "tempo." It was a polka-mazurka, and the injury occurred, after the foot had been thrown forward and was placed upon the floor again, hence from muscular contraction alone. This form of luxation is said to occur most easily when the leg is slightly flexed, and at the same time in abduction and supination. There was no genu-valgum nor anything else abnormal, though the patella was somewhat easily movable. — *Norsk Magazin for Sægevidenskaben*, p. 178-180, 1892.

FRANK H. PRITCHARD (Norwalk, Ohio).

**The Management of Suppuration Complicating Tuberculous Disease of the Bones and Joints.** By VIRGIL P. GIBNEY, M.D. (New York). The author acknowledges that notwithstanding a large proportion of tuberculous disease of bones and joints can be conducted to a cure without suppuration, though appropriate protective appliances early used and intelligently maintained, yet it is just as

true that there are cases which, though taken in the very early stage, with the most approved forms of apparatus, and with the most skillful men in charge of them, do go on to suppuration in spite of all that can be done. His conclusions are summarized as follows :

(1) Protect the joint about which the bone lesion exists in the early stage and in the later stages, whether the abscess is let alone, aspirated or incised.

(2) In cases where the suppurative process is confined to a small area, it is good surgery to leave the small abscesses alone if the protective appliance is adequate.

(3) It is good practice to aspirate where the abscess is in the way of the proper adjustment of apparatus, and by such procedure one may expect good results in at least 50 per cent. of the cases aspirated.

(4) The simple incision of an abscess dependent upon bone disease depends for good results upon the extent of the bone lesion.

(5) Excision of the hip is not a measure to be employed in all cases where extensive suppuration exists, but must depend largely upon the condition of the patient and the location and extent of abscesses.

(6) Expectant treatment for the knee and ankle joint in children yields the best results for life and limb.

(7) Amputation of the ankle in a child is rarely ever justifiable except when amyloid disease of liver or kidneys threatens or is present; of a hip after a thorough excision has failed.

(8) The long-continued employment of a good fitting splint to the back in Pott's disease of the spine will yield better results than any operative procedures on the bones with which I am familiar.—*Proceedings of New York State Medical Society*—Author's Abstract.

#### EXTREMITIES.

**Amputation of the Arm in an Hæmophiliac.** By L. S. PILCHER (Brooklyn). The patient was a man, aged thirty-three, a recognized bleeder, who belonged to a family of bleeders, a maternal

uncle having bled to death from a cut on the head, and a brother having also bled to death from a blow on the nose. He himself had often bled severely from trifling wounds. He was first seen by Dr. Pilcher in 1889, at which time he was suffering from an extensive extravasation into the connective tissue planes of the forearm and hand, the results of a dislocation at the elbow sustained ten weeks before. The dislocation had been left unreduced, and the elbow was already firmly ankylosed in deformity; the hand and forearm were greatly swollen, and suppuration had already attacked and extensively infiltrated the tissues of the hand. The suppurating cavities were incised by the Paquelin cautery knife; the middle and ring fingers were amputated in consequence of the extensive destruction of their tissues. By the careful and persistent use of iodoform tampons, forcipressure, and the actual cautery, the tendency to hæmorrhage was restrained, while a healing granulating surface developed, and finally cicatrization was accomplished. The patient was discharged at the end of seven weeks' treatment with ankylosis at elbow and wrist, with stiff fingers and a generally deformed and useless limb.

Two years and one-half later, in the fall of 1892, the patient presented himself again. The forearm was in a condition of chronic inflammatory infiltration, with discharging sinuses. The extremity still remained a useless incumbrance. In reflecting on the possibilities of relief in the presence of his known hæmophilic dyscrasia, Dr. Pilcher judged that the dangers from hæmorrhage would be quite as great from the incisions that would be required in any attempt at relieving the local conditions of the forearm as from an amputation of the arm outright; while in the latter case the patient would also be relieved entirely of the deformed and useless appendage. Accordingly, he entered the Methodist Episcopal Hospital, and was subjected at once to an amputation just above the elbow. The tendency to hæmorrhage which the cut surfaces presented was fully as extreme as had been expected. In addition to the larger vessels which, though numerous, could be identified and properly secured with clamps and ligatures, a multitude of points of free oozing declared themselves

throughout the whole extent of the cut surfaces. For the control of this bleeding perhaps as many as thirty or more mass ligatures were applied, until the whole surface of the stump was quilted by them. The freer hæmorrhage having thus been controlled, there still remained a somewhat copious bloody serous flow from the general wound surface. To control this the flaps were turned back like a cuff, the cut surfaces thus being turned out, and a circular iodoform bandage applied, so as to compress them firmly against the arm, while upon the end of the bone and upper surface of the stump an iodoform tampon was applied. Over all a suitable absorbent dressing was secured with a firm bandage, so as to maintain equable and strong compression of the limb as far up as the axilla. The patient was put to bed and the arm maintained in a continuously elevated position. An abundant sero-sanguinolent discharge continued to saturate the dressings for some days, requiring repeated changes and the adaptation of special pressure for the control of special points of discharge. By the end of a week, the patient's general strength having been maintained by suitable forced, nutrition and stimulation, it was possible to turn down the flaps and to treat the wound in the usual manner as an open flap amputation. The amount of sanguinolent flow gradually diminished, and a fairly normal granulating surface was finally established. As the case progressed a very marked atrophy and shrinking of the flaps occurred, so that although originally they had been very redundant the end of the bone now projected beyond them, necessitating the removal of an additional inch of the humerus. The hæmorrhage provoked by this was controlled by iodoform tampons and actual cautery. The ultimate closure of the wound was expedited by secondary suturing, and ultimate sound healing was accomplished. During the later course of the case a number of somewhat copious hæmorrhages occurred from time to time from some abrasion of a granulation.—*Author's Abstract.*

## INJURIES.

**The Dangers of Immobilizing Bandages.** By E. A. ISCHERNING (Copenhagen, Denmark). The writer, who is a physician of an accident insurance company, has had ample opportunity to be convinced of the injuriousness of long-worn, immobilizing bandages, in lesions of the bones or joints. He advises beginning early with massage and passive movements, in order to avoid, best, the so-called rigidity from immobilization. Several forms of fracture are considered; in fracture of the radius he advises massage of the muscles of the forearm as well as of the wrist and fingers eight days after fracture; also in fracture of the patella he would massage. If there is a large extravasation of blood, one may puncture it and begin with massage and passive movements from the end of the first week; possibly a separation of the fragments will take place, but the patient will obtain a good joint. One must, nevertheless, use care; either the physician should himself perform the massage or have it done under his supervision. The writer has no doubt of better and more rapid functional results being obtained thus than with the wearisome and long-lasting treatment by bandages.—*Bibliothek for Læger*, R. 7, Bd. III, S. 93.

FRANK H. PRITCHARD (Norwalk, Ohio).

## ABSCESSSES.

**The Treatment of Spinal Abscess.** By W. WATSON CHEVNE, F.R.C.S. (London). The author, after an historical and critical review of the subject, formulates the following conclusions: Complete removal of the disease by dissection is only applicable in very rare instances, practically only in those very uncommon cases in which the disease affects the posterior or lateral parts of the vertebræ, the spines, laminae or transverse processes, not the bodies. Scraping, washing, and injecting is applicable for retropharyngeal and psoas abscess. In the case of retropharyngeal abscess it is best to employ an incision behind the sterno-mastoid, and great care must be taken in scraping not to make a communication with the pharynx. In



psoas abscess the incision may be made either in front of the anterior iliac spine or in the lumbar region. Here, of course, the question of the most dependent opening does not arise. Our object is to get an opening which will give the best access to all parts of the cavity, and, if the abscess has passed into the thigh, an incision in the neighborhood of the anterior superior iliac spine is probably the best; if it be still in the abdomen, a lumbar incision has been looked on as the best, both as regards dependency and distance from sources of contamination, and has been advocated as enabling the surgeon to get at and remove the diseased bone. This last point is not of much importance, because sequestra are much rarer in these cases than caries of the surface, or caseous deposits in the bone, and these cannot be at all thoroughly dealt with by any method. In lower cervical, dorsal and lumbar abscesses the best treatment is free incision into the external portion of the abscess with removal of the wall, and then dilatation of the channel leading to the bodies, scraping, injection of iodoform, and subsequent accurate closure by stitches.—*British Medical Journal*, December 31, 1892.

#### CHEST AND ABDOMEN.

**Thirty-eight Cases of Excision of the Rectum for Cancer.** By J. HARRISON CRIPPS, F.R.C.S. (London). (Concluded from page 377.) CASE IV. *After Six Years.*—T. H., aged sixty-two years, was admitted into St. Bartholomew's in August, 1885, and I removed the last three inches of the bowel for adenoid cancer. He was again admitted, three months later, with a slight recurrence in the form of a small nodule in the lower part of the wound, which was removed. The patient was lost sight of till 1891, when he came to see me at the hospital. He stated that he had been quite well till within a few weeks previously, when he noticed a little blood with his motions. I found a small crack in the cicatricial tissue in the middle line behind. I was in some doubt as to the nature of this, and thought it probably a slight traumatism from a hard motion. I gave him some astringent ointment, and he promised to see me again, if not better, in a few weeks.

CASE VII. *After Twelve Years.*—Miss D., aged forty years, a patient of the late Dr. Matthews Duncan, was operated upon by me, assisted by Mr. Butlin, in July, 1880. About three inches of the bowel was removed, involving nearly the whole circumference, but a narrow strip was left. As in the former cases, contraction was considerable trouble at first, but ceased to be so after two or three years. The patient now leads an active life, has good control, and has remained perfectly well from the date of the operation to the present time (somewhat over twelve years).

It will be seen from the foregoing reports that there are two prominent features which have an important bearing on the after-treatment of rectal excision. The first, and one that is common to nearly all cases, is the tendency to contraction, and the second that, in no fewer than three of the cases, there was a recurrence which was successfully treated by a second operation.

The contraction, which is so troublesome, can to a great extent be avoided by the proper treatment of the wound during the healing process. The contraction seldom commences till the third or fourth week, but will, if not prevented in the course of a few months, lead to almost complete closure of the outlet. This complication can in a great measure be prevented by introducing into the bowel a full sized rectal bougie an inch and five-sixteenths in diameter. This should be commenced at the end of a fortnight, and allowed to remain in for some hours daily for a month. The patient should then be directed to pass the bougie once daily for a year or even longer. The tendency to contraction seems gradually to disappear, and gives comparatively little trouble after the second year.—*British Medical Journal*, December 10, 1892.

#### GYNÆCOLOGICAL.

**I. Supra-vaginal Amputation of the Cervix Uteri for Carcinoma.** By F. BOWREMAN JESSET, F.R.C.S. (London). The author presents a report of the twenty-five cases tabulated below for the purpose of giving his support to the operation of supravaginal

amputation of the cervix in those cases only in which the cancerous growth is limited to the external os or the cervical canal. He considers the operation contraindicated if the vaginal wall or the body of the uterus are implicated.

The author defines his understanding of the term "supravaginal amputation" as not only the amputation through the cervix, by which operation the neck of the uterus is removed, but also the removal at the same time of a large cone-shaped piece from the body of the uterus, which cone may be extended, if necessary, to the fundus. Undoubtedly the mortality of supravaginal amputation is much less than that of total extirpation of the uterus, which renders it the preferable operation in the cases in which the body and vagina are not involved.

No.	Age.	No. of Children.	Duration of Disease.	Condition of Parts.	Result.
1	60	Sev'l.	Some mos	Os ulcerated and hardened; cervix feels thickened and somewhat nodular; uterus freely movable; vagina free.	Recurrence twenty-eight months later.
2	61	3	Some mos	Os ulcerated, extending into cervical canal; bleeds readily; offensive discharge.	An excellent recovery. Death from bronchitis two years later. Autopsy showed uterus absolutely free from recurrence.
3	42	4	6 mos	Os presented a ragged, ulcerated surface; cervix hard and thickened; uterus movable; vagina free.	A good recovery without recurrence three years later.
4	41	2	12 mos	Posterior lip of os thickened and rough; deep ulceration extending into cervix; uterus movable; vagina free.	Recovery; no recurrence after three years. Dysmenorrhœa.
5	54	2	5 mos	Os and cervix indurated and somewhat ulcerated; uterus enlarged and only slightly movable. Father died of cancer of stomach.	Stump healed slowly; recovery; recurrence in three months.
6	29	4	6 mos	Cervix hard, thickened and fissured; os ulcerated; uterus movable; vagina free.	Recovery. No recurrence after thirty-two months.

No.	Age.	No. of Children.	Duration of Disease.	Condition of Parts.	Result.
7	54	2	8 mos	Cervix enlarged and indurated; vaginal surface free; offensive discharge; uterus movable. Sister died of cancer of uterus.	Severe hæmorrhage during operation. Recovery; recurrence in a few months.
8	45	3	10 mos	Cervix enlarged, indurated and ulcerated; several isolated nodules on cervix; uterus movable. Aunt died of cancer.	Recovery. No recurrence after thirty-three months.
9	35		8 mos	Cauliflower growth from cervix; uterus movable.	Death from pelvic cellulitis.
10	42	6	10 mos	Irregular ulcerated growth from cervix; vagina free; uterus movable.	Recovery; recurrence in a few months.
11	60	2	4 mos	Large cauliflower growth from cervix; bleeds freely when touched; uterus movable. Father died of cancer of liver.	Recovery; no recurrence after twenty-eight months.
12	39	4	12 mos	Cervix ulcerated and ragged; uterus somewhat fixed; offensive blood-stained discharge; disease extended into body of uterus.	Slow recovery; immediate recurrence.
13	43	11	9 mos	Irregular growth of considerable size springing from cervix; left side of os more especially affected; considerable hæmorrhage at times.	Recovery; no recurrence after twenty-eight months.
14	54	1	6 mos	Os extensively ulcerated; cervix hard and indurated; uterus movable; sharp hæmorrhage during operation; forceps left on.	Recovery; no recurrence after twenty-five months.
15	57	1	12 mos	Well-defined rough, irregular growth from cervix; vagina free.	Recovery; no recurrence after two years.
16	51		12 mos	Hard, irregular mass from os; uterus movable.	Recovery; no recurrence after twenty-three months.
17	45		8 mos	Ulcerating mass protruding from cervix; uterus movable; vagina free.	Recovery; no recurrence after twenty-two months.
18	47	3	6 mos	Cervix infiltrated with growth; uterus movable; vagina free.	Recovery; no recurrence after twenty-one months.
19	45		6 mos	Large cauliflower growth extending half way down vagina; vaginal walls implicated posteriorly. Supra-vaginal amputation and removal of disease with scissors.	Death in one week; unsuitable case.
20	44	3	7 mos	Os deeply ulcerated; cervix thickened and hardened.	Good recovery; no recurrence after 18 months.

No.	Age.	No. of Children.	Duration of Disease.	Condition of Parts,	Result.
21	45	7	12 mos	Large, ulcerated mass protruding from cervix, implicating vaginal wall.	Recovery; recurrence in three months.
22	45		10 mos	Large, hard, ulcerated mass implicating both lips of os; uterus movable; vagina free.	Good recovery; no recurrence after sixteen months.
23	51	5	5 mos	Os and cervix deeply ulcerated; hard infiltration; uterus movable; vagina free.	Good recovery; no recurrence after one year.
24	40	8	2 years	Small eroded surface at posterior lip of os; great thickening and induration of cervix.	Recovery; no recurrence after one year.
25	51	6	3 mos	Os has deeply ulcerated patch on posterior lip, with roughened and everted edges; bleeds freely.	Recovery; no recurrence after one year.

The author remarks that the early recurrence in cases 5, 7, 10 and 12 shows they were unsuited for this operation; in cases 5, 7, 10 and 21 vaginal hysterectomy would doubtless have been of more permanent benefit, and in case 19 simple curetting and plugging with chloride of zinc wool might have been better treatment.—*London Lancet*, December 24, 1892.

**II. Supravaginal Amputation of the Cervix Uteri for Cancer.** By Dr. LEWERS (London). Basing his paper on the experience of nineteen cases, the author divided his paper into four parts: (1) The indications and contraindications for the operation, and under this head he particularly emphasized the importance of careful examination under anæsthesia in doubtful cases in order to determine their suitability for operation; (2) the mortality, stating that none of his cases succumbed to the operation; (3) recurrence, in connection with which he remarked that he had full proof of the malignant nature of those cases where the disease had not recurred for periods of two years and upward; (4) details of his operation in those of his cases in which the disease had not recurred within two

years or more. Under this head he dwelt upon: (*a*) The importance of making the preliminary incisions for clearing the cervix as far as possible from the diseased tissue: (*b*) the importance of removing the cervix in an anatomically-complete condition at the level of the internal os uteri: (*c*) the little risk involved in opening Douglas' pouch during the operation: (*d*) the apparent value of applying the cautery freely to the "bed" from which the cervix had been dissected out and of cutting the cervix off from the body, after it had been cleared, with the cautery rather than with the knife or scissors. The mortality of total extirpation of the uterus was about 16 per cent.; still, if a case were found at the operation to involve much of the body of the uterus, total extirpation was the better operation. He had never met with occlusion after the amputation of the cervix, but he had seen considerable narrowing, which led to a little increase of the dysmenorrhœa usually present in the case.—*London Lancet*. December 17, 1892. JAMES E. PILCHER (U. S. Army).

## REVIEWS OF BOOKS.

DIE PLEURA-EKRANKUNGEN. VON PROF. DR. C. GERHARDT.  
AFFECTIIONS OF THE PLEURA. Stuttgart: Verlag Von Ferdinand  
Enke, 1892.

This work on the diseases of the pleura belongs to that most excellent series constituting the *Deutsche Chirurgie*. The title of the book is misleading, as it is not devoted to the diseases of the pleura in general, but especially to hydrothorax, pyothorax and pneumothorax.

The first chapter is a historic sketch of the surgery of pleural exudates from pre-Hippocratic times. Following chapters take up the aetiology, pathology, diagnosis, etc. A good chapter is the one on spontaneous perforation, in which the author speaks of the reasons why pus perforates the chest wall, while the simple serous exudate of hydrothorax does not. "From various sorts of pus," he says, "a substance can be extracted with glycerine, which, under an alkaline reaction, has the power of dissolving fibrous tissue." This substance, he goes on to say, is a product of bacterial decomposition, and may be regarded as a sort of digestive ferment.

Thoracocentesis is indicated—(1) when the disease is threatening life; (2) when it cannot be cured by other means; and (3) when the presence of the fluid gives rise to symptoms which cannot be borne. Thoracotomy is also systematically treated. In this chapter, under the head of pleural reflexes, are treated the nervous symptoms excited by surgical treatment of pleural exudates. Sudden unconsciousness during irrigation of the pleural cavity, unconsciousness, with tonic and clonic spasms, monolateral paralysis, hemichorea, aphasia, paralysis of groups of muscles, and pleural eclampsia are spoken of.

The chapter on thoracotomy, with resection of rib, offers nothing new. A final chapter is given to pneumothorax.

The work is a compilation of the modern surgical views with regard to pleural exudates. It is systematically compiled, and enriched with abundant references to the literature upon the subject, and interspersed with clinical reports and observations.

JAMES P. WARBASSE.

## ANNOUNCEMENT.

### GERMAN SURGICAL SOCIETY.

THE Twenty-second Congress of the German Surgical Society will be held in Berlin from the 12th to the 15th of April. The welcoming of the members will take place April 11, at 8 o'clock in the evening, in the Rococo Hall of the Central Hotel.

During the progress of the congress, and also on Wednesday, April 12, the morning sessions will be held from 10 till 1 o'clock, and the afternoon sessions from 2 until 4 o'clock, in the large audience hall of the Langenbeck House.

In accordance with the resolutions adopted at the Twenty-first Congress, the collective observations of the members concerning anæsthetization will be presented in order to bring together a large amount of information. In these observations the following points will be given especial attention:

- (1) The period over which the observations extend.
- (2) Which anæsthetics (chloroform, ether, mixtures of the same, etc.), and how each particular one is used.
- (3) Source of supply of the same.
- (4) Apparatus, etc., employed.
- (5) Observations of narcosis of unusual length—one hour and over.
- (6) Consumption of anæsthetic per minute, or the average for each narcosis, or maximum consumption in narcosis of unusual length.
- (7) Whether, and in what amount, the injection of morphine was employed.
- (8) Accidents through narcosis: (a) Asphyxia (treatment, tracheotomy, etc.); (b) deaths (causes, results of autopsies, etc.).

PROF. DR. F. KÖNIG,

*Chairman for the year 1893.*

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# INTRACRANIAL NEURECTOMY OF THE FIFTH NERVE.

By FRANK HARTLEY, M.D.,

OF NEW YORK.

SURGEON TO THE NEW YORK AND TO THE CANCER HOSPITALS; ASSISTANT SURGEON TO ROOSEVELT HOSPITAL.

IN an article published in the *Archiv für klinische Chirurgie*, Band XLIV, viertes Heft, Prof. Fedor Krause claims to be the originator of a method for intracranial neurectomy of the fifth nerve, which I find upon reading is in every particular similar to a method devised by me. My operation was devised and practiced upon the cadaver for one and a half years before its performance upon the living subject. It was performed six and a half months before Prof. Krause's operation, and was shown at the New York Surgical Society one and a half months before the performance of his operation. My case was published in the *New York Medical Journal* of March 1, 1892. Prof. Krause read his paper at the meeting of the Deutsche Gesellschaft für Chirurgie, June 10, 1892, and published it in *Archiv für klinische Chirurgie*, October 11, 1892.

As there seems to be some misunderstanding in the exact detail of the method, I have deemed it not out of place to give a resumé of the cases so far performed according to this method, and an account of the operation itself.

The method is as follows: <sup>1</sup>

An omega-shaped incision was made, having its base at the zygoma and measuring a distance marked by a line drawn from the external angular process of the frontal bone to the tragus of the ear.

The curved and rounded portion of this incision reached as high as the supratemporal ridge, the diameter of said circle being three inches. The skin and deeper tissues were cut in the shape of the Greek capital letter omega. This incision was carried down to the

<sup>1</sup> Copied from the New York Medical Journal, March 19, 1892.

periosteum of the skull in all portions of the incision, except in the straight part at the base; the tissues were then retracted and the periosteum divided upon the bone in the same direction and as far as the straight part at the base.

With a chisel a groove was cut in the bone corresponding to the divided periosteum. This groove went to the vitreous plate, except at the upper angle over the rounded portion, where it included the vitreous plate.

A periosteum elevator was here inserted and used as a lever to snap the bone on a line between the ends of the circular portion of the incision. In this way the breakage occurs along the lower portion of the wound, and a flap, consisting of skin, muscle, periosteum and bone, is thrown down, exposing the dura mater over a circular area of three inches in diameter. The middle meningeal artery was tied, the dura mater separated from the bone, and the floor of the middle fossa of the skull was exposed. Broad retractors were used to raise the dura mater with the brain, and to expose the foramen rotundum and the foramen ovale. The hæmorrhage was stopped by sponge pressure. The exposure of the first, second and third divisions of the fifth nerve, together with the carotid artery and cavernous sinus, was exceedingly good.

The second and third divisions were isolated at the foramen rotundum and the foramen ovale, and, by slight pressure upon the dura mater, it could be stripped from the nerves to beyond the Gasserian ganglion. These were divided with a tenotome at the foramen rotundum and the foramen ovale, and that part between these and a point beyond the Gasserian ganglion was excised. As this amount of nerve is not very great, the ends of the nerves were pushed through the two foramina so as, if possible, to interfere with any reunion. In the retraction of the dura mater, owing to imperfect instruments, the third, fourth and sixth nerves were somewhat injured. As no bleeding was present, the brain was allowed to fill the fossa. The flap—consisting of bone, periosteum, muscle and skin—was replaced. The irregular edge of the vitreous plate which remained attached to the bone not involved in the flap acted as a shelf on which the flap rested, and prevented its falling in upon the dura mater. The periosteum was stitched, the muscle sutured in place, and the skin sewn with silk. One drainage tube was inserted at the lower angle; an antiseptic dressing was applied. Time of operation, one hour and forty minutes; the patient was carried to the ward in

good condition. The disadvantage was the inability to resect as long a piece as could be done in some of the other methods.

The operation was performed on August 8, 1891, in the manner described above. The history of the case was as follows:

J. D., aged forty-six years, married, England, salesman, admitted to Roosevelt Hospital on August 8, 1891. The patient's father died of pleurisy; in other respects his family history is negative.

*Personal History.*—Patient denies rheumatism and syphilis. He has had malarial disease, but in other respects has been perfectly healthy.

In December, 1882, he was seized with a sharp neuralgic pain, at first referred to a spot about two inches to the left of the symphysis menti. This pain radiated over the whole left side of the face and head, involving the temporal region as far as the temporal ridge, and the left side of the tongue and mouth over the upper and lower jaws. The left orbit was involved in this attack.

This attack lasted eighteen hours, and, after an interval of four days, during which time momentary attacks of pain were present in the same region, it reappeared. The second attack was more severe, and lasted two or three days. For the next two years he had constant pain over this region, and was treated medicinally with aconitine and morphine.

In September, 1884, the infra-orbital nerve, with Meckel's ganglion, was removed.

From the scars left, one would judge that either Wagner's or Chavasse's operation was performed at this time.

For four or five weeks he had partial relief. The constant pain disappeared, but the spasmodic twitchings continued. It soon reappeared, however, and the patient was again treated with aconitine and morphine.

He had at this time thirty-one teeth drawn, thinking that the origin of the pain was located in them.

After eighteen months (1886), section of the inferior dental nerve was made by the same surgeon. The scars would lead one to think that Velpeau's operation was performed at this time.

On recovering from the ether he had an attack lasting seventeen days. From that time to the present he has had no change in his condition. The pain has been constant, except for an occasional

period of one or two days. The contractions in the muscles of the face amount to forty in about thirty minutes.

Owing to the previous operations and the involvement of the lingual and auriculo-temporal nerves, I decided to attack the nerve at a point where I could divide the second and third divisions of the fifth nerve completely by one operation. The operation intended was to attack the nerve on the inner surface of the skull outside the dura mater, to isolate the second and third branches completely, to divide and resect as long a portion as possible. The advantages thought to exist in this method over Pancoast's, or its modification by Krönlein, Credé and Salzer, or Lücke's operation, were the easy access to the nerve, the comparatively large field for work, the rapidity with which the operation could be done, and the small amount of hæmorrhage.

For the week following the operation the patient did well, and was free from pain.

August 16.—On changing the dressing, ptosis of the left upper lid appeared, together with double vision and inability to move the eye. The patient was entirely free from pain, and continued to do well for one week.

August 23.—To-day a slight dermatitis appeared over the area of operation, which is treated with ichthyol (10 per cent.) and bichloride irrigation.

On August 24 Dr. W. Vought examined the patient for me, and reported as follows: "The area of anæsthesia may be seen upon the shaded portion of the drawing. The other areas were the left side of the mucous membrane of the mouth over the upper and lower jaws, of the soft palate, of the anterior two-thirds of the left side of the tongue, of the left conjunctiva and cornea, and of the left nostril. Muscular paralysis, complete, of the left buccinator, the pterygoids, and the left occipito-frontalis (frontal portion); almost complete, of all the external muscles of the eye. Ptosis: pupil normal. Nerves divided: the second and third divisions of the fifth nerve, the branch of the seventh to the occipito-frontalis; injured, the third, fourth and sixth nerves. The ophthalmoplegia externa I should give a fair prognosis for spontaneous recovery, as you will see by examining the patient that *slight* movement of all the eye muscles is present, which leads me to think the nerves have not been divided, but merely severely injured. The ptosis could be corrected at any time."

August 30.—Patient is to-day discharged cured, and returned to the Vanderbilt Clinic, Nervous Department.



FIG. 1.—Showing area of superficial and thesial after intracranial neurectomy

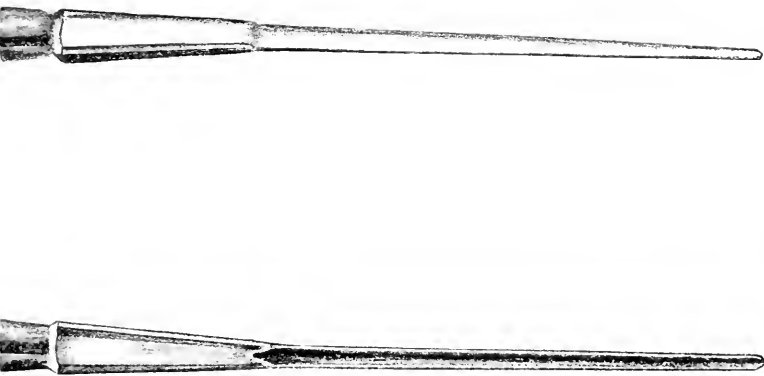


FIG. 2.—Chisels used for cutting cranial wall.

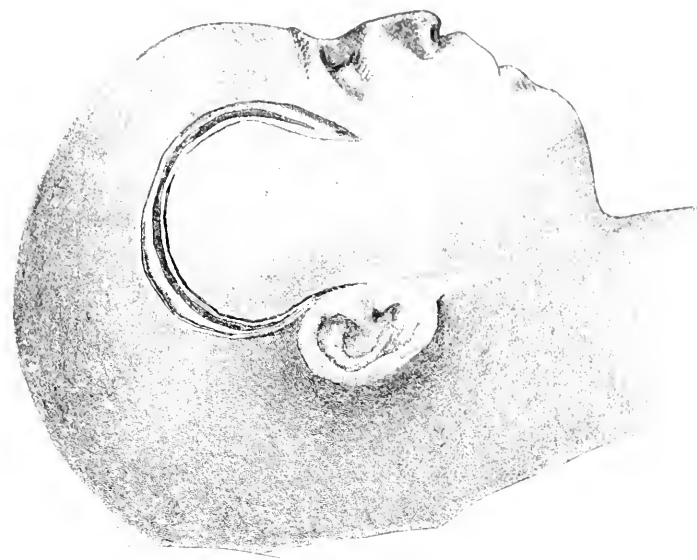


FIG. 4.—Showing primary incision through soft parts.



FIG. 3.—Retractor for holding brain out of the operative field



September 30.—Patient has recovered from his paresis in the third nerve; the double vision, ptosis and inability to use the third nerve have entirely disappeared. The paralysis of the pterygoids, temporal and masseter muscles, produced by the division of the motor portion of the fifth, seems to have incommoded him to a very slight extent. The false teeth worn in the lower jaw before the operation fit quite accurately their opponents in the upper. Protraction and retraction of the lower jaw seem to be diminished, but elevation and depression of the lower jaw seem good. As the patient has chewed since 1882 all his food on the side opposite to the present paralysis, he has not been distressed by the division of the motor portion of the fifth.

January 1, 1893.—The patient informs me that he is at present entirely free from pain, and has gained in weight sixteen pounds.

The patient was presented to the New York Surgical Society on January 13, 1892. The second operation was performed by Prof. Fedor Krause February 23, 1892. An account of this operation was published in the *Archiv. für klinische Chirurgie*, October 11, 1892, and this paper was read at the Twenty-first Congress der Deutschen Gesellschaft für Chirurgie, June 10, 1892. The history of the case is as follows:

Female, aged forty-seven years. Prof. Volkmann just before his death had performed neurectomy of the second division of the fifth upon this patient, taking out the nerve from near the foramen rotundum to its terminal branches.

Almost immediately after the operation a recurrence of pain took place. The patient was again operated upon by a method combining portions of Krönlein's and Salzer's methods, in which the divided end was found in the speno-maxillary fossa, and torn out from the foramen rotundum. One and a half centimetres of the nerve were thus obtained. In eight days the patient's wound was healed. A few months later a second recurrence of pain took place.

On February 23, 1892, an operation was performed which in many of its points resembles my own. The incision, the cutting of the bone, its elevation, and the raising of the dura mater are all similar. The amount of hæmorrhage obtained in this case was far greater than seen in any of the cases so far performed. On account of this hæmorrhage, which occurred during the separation of the dura

mater from the bone. the cavity was packed with iodoform gauze and a dressing applied. Five days later the patient was again chloroformed, and the dressing was removed. together with the iodoform gauze packing. The nerve was found, and one-half centimeter of the second division of the fifth nerve was excised. The iodoform gauze packing was replaced between the dura mater and the bone and a dressing applied. A few days later all packing was removed, the bone, muscle and skin flap was replaced and each tissue was accurately coapted. The union was undisturbed.

On September 15, 1892, the patient was reported as well, with no recurrence.

The third operation was performed by Dr. Chas. McBurney.

Woman, aged sixty-four years, native of Germany, was admitted to Roosevelt Hospital on July 8, 1892. Family history was negative. Personal history: For fourteen years the patient has suffered from neuralgia of the face. The pain has been paroxysmal in character. During the last five years the pain has increased in intensity, and in the frequency of the paroxysms. Ptosis of the left eye and lachrymation are present and are increased during the paroxysms. The area affected by the neuralgia seems to be the three branches of the fifth nerve. The urine is acid; specific gravity is 1012; no albumen; no sugar: clear. Microscopic examination is negative.

July 27, 1892, an omega excision, extending from below the zygoma just behind the frontal process and carried as high as the temporal ridge, was finished in front of the antihelix. The incision extended to the bone. The bone was chiseled in the incision and the flap, consisting of the superjacent tissue and bone, was raised with an elevator. This flap was turned down over the zygoma. The dura mater was separated from the bone. The brain was raised with a retractor, and the fifth nerve was exposed.

The second and third divisions were cut, and the ends were separated as much as possible. Bleeding had not been excessive. This was readily stopped by sponge pressure. The flap was replaced. The periosteum and superjacent tissue was united with catgut. The skin was sutured with silk. In the anterior angle of the wound a short drainage tube was inserted. Antiseptic dressing was then applied.

The reaction from operation was good. In the first twenty-four



hours the temperature reached  $101^{\circ}$ . It reached the normal on the next day.

Ptosis of the left eyelid was present after operation, and continued for one week. The wound healed by primary union. The patient was discharged from the hospital on August 14 with no return of the pain.

The fourth case was operated upon by Dr. John B. Roberts, of Philadelphia, on November 5, 1892, and was published in pamphlet form as follows:

"The patient is a man seventy-six years of age, on whom I operated about two years ago for frightful neuralgia, which affected the first and second branches of the fifth cranial nerve. He had been operated on previously without success. I removed the supra-orbital and infra-orbital nerves at their anterior foramina, chiseling away the lower part of the orbit in order to tear off the latter nerve as far back as possible. He had a period of comfort for perhaps a year, when the disease returned. He was then operated on, I think, by Dr. John B. Deaver. I do not know what Dr. Deaver did, but I believe that he cut out the cicatrix. The man came to see me again a year ago, and I decided to ligate the primitive carotid, which has been recommended in some of these cases, and which I had found satisfactory in a case operated on six months previously. I operated last November, tying the primitive carotid with catgut. He was discharged at the end of three weeks, suffering no pain.

He again began to suffer, and has appeared at my office two or three times in the last three or four months. His pain was so great that I decided to attempt the removal of the Gasserian ganglion. I had long made up my mind that the route advised by Rose, of England, of cutting away the coronary process of the lower jaw and the zygoma, and trephining from below, was an operation of great severity; and although he has reported several cases of cure, I had about made up my mind that I would not try it. In March of this year I saw the description of the operation proposed by Hartley, of New York, which is somewhat similar to that of Horsley. An opening is made by Horsley in the temporal region, the dura mater opened, and by getting under the temporal lobe the fifth nerve is cut off at the pons, and the ganglion also removed. The case on which this operation was done died. When I saw Hartley's operation described, it seemed to me that it presented the better method, and

I determined that I would adopt it in a case where such operation was indicated.

Four days ago I made an omega-shaped incision, beginning at the external angular process of the left side, ascending to the temporal ridge, and coming down at the tragus. With a sharp chisel I cut through bone in the same line; above, going down to the dura mater, but below through to the diploë only. With a lever the bone, muscle and integument were turned down over the zygoma as an osteo-cutaneous flap. This exposed the dura mater and the middle meningeal artery. The trunk of the artery was not torn, because it ran in a groove and not in a foramen at the angle of the parietal bone. A small opening in an upper branch was bleeding, and was secured by two sutures passed above and below the opening. The dura mater was next separated from the base of the skull and the foramen rotundum exposed. I was surprised at the ease with which I could press the brain over to the right to make room for my manipulations. As I pressed upon the brain the man's left hand—that is, on the same side as the operation—went into a state of tonic contraction or spasm, which disappeared as soon as the extreme pressure was stopped. With a tenotome I cut off the second division of the fifth nerve, which was the one that gave pain, close to the round foramen, and endeavored to follow it back to the ganglion. I was unwise in using a blunt pointed tenotome, dissecting backward along the nerve, for before I got through the dura I cut or tore the nerve off close to its attachment to the ganglion. This made me lose my landmarks, and I could no longer trace my way back by holding on to the nerve with forceps. I then cut off the third division at the oval foramen, and again made the attempt to dissect up to the ganglion, but practically the same thing happened. During this time there was a good deal of bleeding, probably from the petrosal sinus, but by changing the position of the patient's head the blood did not obscure the field, and with the electric light and head mirror I had a good view. After spending considerable time I concluded, after consultation with my colleagues, that I had probably done enough, without uncovering and removing the Gasserian ganglion. I had excised the painful nerve (the second division) from close in front of the ganglion to the round foramen, and had pushed the distal end of the nerve forward into the canal. I had also excised the third division from the Gasserian ganglion to the oval foramen and pushed the distal stump into its canal in the same manner. The flaccidity of the dura rendered it

a little difficult to cut through the layer covering the ganglion with accuracy. The use of a uterine tenaculum to make the dura tense would probably have helped me.

I allowed the brain to come back into place, shut down the lid of bone, and sutured the skin, using no drainage. The eyelids of the left eye had been sewed together before the operation, lest corneitis might develop after removal of the ganglion.

The patient has done so extraordinarily well that I can hardly believe it myself. He has not had a bad symptom; there has been no paralysis, no aphasia, and he has needed no anodyne. This is the fourth day. The pulse is 72; respiration, 17, and temperature 98.4°. There has been no neuralgic pain. He has the same "queer" sensation in the infra-orbital region which he had after ligation of the carotid artery, and which soon disappeared. On the second day I found him slightly propped up in bed reading the paper. He catheterizes himself three or four times a day, being the subject of old bladder disease, and is doing perfectly well. The portions of the nerves removed are shown in the bottle which I have passed around.

NOTE.—It is now eighteen days since the operation, and the wound is entirely healed by first intention. The man is well, except that he complains of headache. This is probably due to the aseptic cerebral inflammation at the seat of traumatism. He is up, goes out, and has normal respiration, pulse and temperature. He reads, talks and seems the same as before operation, except that he is relieved of the torturing neuralgic pain, and has the dull headache. He complains of an "ugly" feeling at times in the cheek. It is not at all the pain he had previously. After this report was written it was noticed that he could not recall the names of the city streets and of the physicians. This was probably an aphasic symptom, and it is now improving, being scarcely noticeable.

The fifth operation was performed by Dr. Chas. McBurney:

Male, aged fifty-one, native of France, was admitted to Roosevelt Hospital January 9, 1891, suffering from an intense supra-orbital neuralgia upon the left side. The duration of this neuralgia was eight years. During the last few months the pain has been shooting in character, and the paroxysms last one or two minutes. The pain shoots over the forehead and down the side of the nose and upper lip. Talking now brings on the pain, although formerly this was not the case.

Physical examination of the patient is negative. The urine is acid, clear, and the specific gravity is 1030. No sugar or albumen is present. Microscopical examination is negative. Operation. Ether. Incision just above supra-orbital ridge, transverse one and a half inches in length. The nerve was found and drawn out from under the orbital margin; one and a half inches of the nerve was excised. Dressing.

January 10. Several attacks of pain, but the paroxysms were not so frequent as before. Temperature normal.

January 11. Patient had four attacks this morning.

January 12. Several long and severe attacks, lasting five to ten minutes.

January 13, 14, 15, 16. No pain in the supra-orbital region, but it still continues in the nose, cheek and lip.

January 19. Infra-orbital nerve excised by an incision parallel to the infra-orbital margin, and finding the nerve lifting the eyeball and cutting it as high as possible. Drainage tube and dressing.

January 20. No pain.

January 24. Wound healed and patient discharged. Readmitted to hospital December 9, 1892.

Patient complains of intense pain over the left side of the face, through the distribution of the fifth nerve. It involves the tongue (left half), the cheek over the infra-orbital and supra-orbital regions, extending over the scalp as far as the posterior border of the ear and to the median line.

The pain is now continuous, without paroxysms of increased severity.

*Operation.*—December 9, 1892. From the external angular process a curved incision was made running as high as the temporal ridge, and ending one-half inch in front of the meatus of the ear. This incision was carried to the bone, and the groove in the bone was cut along the line of incision. A very small trephine (three-eighths of an inch) was used at the highest point of the upper border, in order to insert the elevator beneath the bone. The bone is elevated and snapped at the lower part. The middle meningeal artery is ligated. Dura mater was lifted together with the brain and held away by retractors. The second and third divisions of the fifth nerve were caught, and a small piece removed. The flap was replaced. Antiseptic dressing applied.

December 10. No pain; temperature, 99.8°.

December 12. No pain; temperature,  $103^{\circ}$ . Dressing is removed; wound is aseptic; slight ptosis and internal strabismus. Dressing reapplied.

December 17. Sutures removed. Primary union.

December 21. Ptosis has almost completely disappeared. Patient discharged from the hospital.

These cases comprise all of those which I have been able to find in literature which have been performed in this manner. It is interesting to note that though the method has been used by four different operators, in all cases the symptoms have been relieved, the healing of the wound has been by immediate union in four cases, and in one case without suppuration, though delayed for several days. In no case has there been a fatal issue, nor has there been any evidence of shock, concussion nor lasting contusion of the brain from the manipulations.

Since my first operation I have been interested particularly in the hæmorrhage which occurs, or may occur, during the operation, in the ability to remove the nerve to and beyond the Gasserian ganglion, in the complete union of the osteo-periosteal flap, as well as in an easy means of dividing the bone.

During the incision through the skin and to the bone the hæmorrhage is easily checked by forceps. In chiseling the groove in the bone, the hæmorrhage encountered is easily checked and removed by sponges, so that it does not in any way interfere with the operator. As the hæmorrhage here is derived alone from the diploë, it is never severe, nor difficult to check with pressure.

The middle meningeal artery, unless it be enclosed in the groove in the parietal bone, is not injured in elevating the flap, and should it be injured it is in full view, and its ligature is an easy matter. The hæmorrhage in separating the dura mater from the bones, provided it be done with the finger and carefully, is never of moment. The middle meningeal artery is carried in the dura mater away from the bone, and will not in gentle manipulations be injured. One can separate the dura with safety and ease until the foramen ovale and spinosum are seen. It may be here ligated or left without a ligature, provided the dura sepa-

rates easily, and to such an extent as to allow one to follow the nerve. There is no difficulty in stopping this hæmorrhage by pressure, for I have only in the last week had a case in which hæmorrhage from the cavernous sinus was readily controlled by pressure during an operation for a perforating wound of the base of the brain and hæmorrhage from cavernous sinus. When one approaches the puncture of the second and third divisions of the fifth nerve on the outer border of the cavernous sinus care must be exercised in separating the dura from the wall of the sinus.

This is especially true when the nerves have been divided at the foramen rotundum and ovale, and the dissection is being carried up through the canal of Meckel over the carotid artery. In all cases it is necessary to notice whether a lesser meningeal branch is ascending through the foramen ovale before dividing the nerve here. Sponge pressure is quite sufficient to stop hæmorrhage from this point.

The trigeminus nerve leaves the pons on the ventral portion of the crura cerebelli ad pontem by two roots, which are separated by a small interval, the *Lingula Wristergii*. The small and inferior root is motor. The large and posterior root is sensory. The nerve passes out external to the sixth or abducens nerve between two layers of the dura mater into a cavity called the *Cavum Meckelii*. This cavity or canal in the dura mater passes from the *impressio trigemini* of the temporal bone external to the cavernous sinus to the angle of the supra-orbital foramen, the foramen rotundum and foramen ovale. The structure of the sensory portion of the nerve changes at the superior border of the petrous portion of the temporal bone, in that the parallel bundles of the nerve separate and again uniting form the triangular plexus in which many ganglion cells are found. The nerve then enters the Gasserian ganglion, which extends from the posterior apex of the clinoid process posteriorly and laterally to the external border of the internal opening of the carotid canal. It is flattened from above downward, and is half-moon-shaped, with its convex border placed anteriorly. The superior portion is closely attached to the internal layer of the dura mater, while its superior surface is loosely attached to the



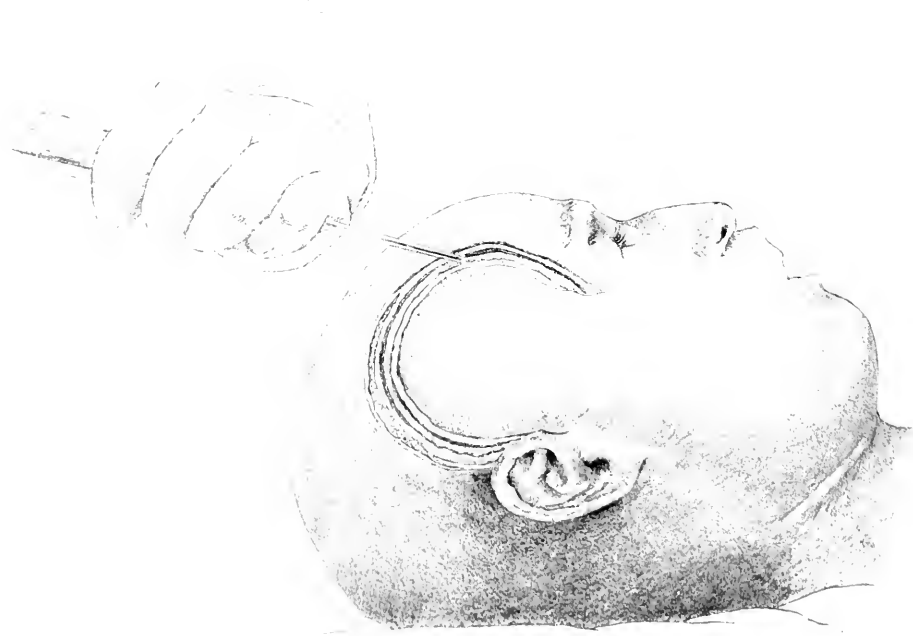


FIG. 5.—Showing manner of holding the chisel in cutting the groove through the bone.

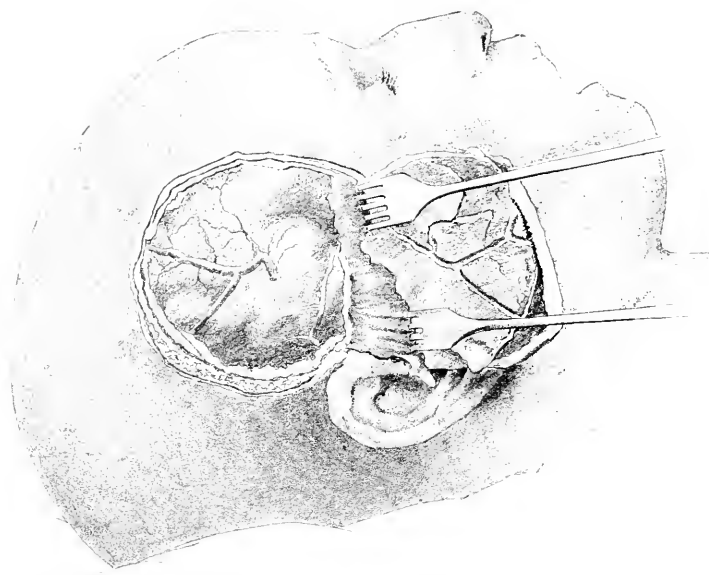


FIG. 6.—Flap elevated and turned down, exposing dura mater and middle meningeal artery.



external layer of the dura mater. From its anterior border it gives off the first, second and third divisions of the nerve. The ganglion lies between the external and internal layers of the dura mater, and is very loosely attached to the external layer, while its attachment to the internal layer is close. The cavernous sinus is situated internally to this, between two layers of the external division of the dura mater. If one keeps in mind the anatomy of this region, not only can the second and third divisions be completely removed, but the ganglion as well. The ganglion is accessible as far as the superior border of the petrous portion of the temporal bone, if one will divide the second and third divisions below at their foramina and fastening them with a forceps or hook, divide the dura mater covering the nerve so as to lift the roof of the Cavum Meckelii and separate the ganglion from this wall. This division of the dura mater is made at the outer border of the cavernous sinus and the carotid artery. The traction upon the nerves allows of an exposure of the ganglion, which can now be torn out, divided with a tenotome, or removed with a very fine Volkman spoon. The ganglion lies over the carotid artery, and is not so difficult to remove as one would imagine.

I have made use of various means for dividing the bone, including electrical saws, gouges and chisels, but have been unable to find any instrument which could accomplish the division of the bone in a more rapid manner than a chisel used by cabinet makers, and modified by Dr. C. F. Parker and myself. This chisel is used in two sizes, one fitting exactly into the groove of the other one. (See Fig. 2.)

It consists essentially in a groove made upon a blade which is triangular upon cross section. The blade increases in size as it approaches the handle. At the cutting edge the triangle is gradually lost, so that it presents a deep groove only at its end. The deeply-grooved edge when the chisel is properly sharpened and held at an angle of forty-five degrees to the skull, will always cut in a line parallel to the skull. The elevation or depression of the handle will cut away a thicker or thinner piece as one wishes. When the chisel is properly held, the bone removed is

always upon the same level. I have repeatedly tried to injure the dura mater with the chisel held at forty-five degrees, and have been unable to do it, as the shoulder formed by the triangular portion in sharpening it protects the dura.

With the larger chisel the groove is cut nearly to the vitreous plates in one continuous motion. The smaller chisel is then used and the remainder of the bone is cut. This is accomplished by the smaller chisel without cutting any bone already cut. This facilitates the cutting of the bone. The second chisel is made to occupy the groove of the larger one, and will not cut bone already cut by the larger one. Two specially made retractors may be used to advantage. The more important one is broad and flat, and made so as to fit the inequalities of the floor of the middle fossa of the skull near the cavernous sinus at its extremity, while it becomes broader above, so as to hold the brain away (Fig. 3). It is a highly-polished instrument, so that it acts also as a reflector for light. The second retractor is very similar to a uterine hook, except that it is blunt at its extremity, and forms not a right, but an obtuse angle with the shaft of the instrument. This is used to raise the dura mater just over the ganglion. These two retractors I have found to be of the greatest advantage, as they facilitate the manipulations at the base near the sinus and artery. Considering the favorable results so far obtained in the first five cases by the four different operators, a further trial to determine the value of this method of neurectomy is not demanded so far as its immediate benefit and the wound healing is concerned. In all neurectomies the value will be determined by its remote effects, and although the oldest case dates from August 8, 1891, with no recurrence of pain, more cases will be required to substantiate its value, and a longer duration of time must elapse without recurrence of pain.

The following plates, taken from photographs, represent exactly the various steps and the field of the operation:

This drawing (Fig. 4), which is made from a photograph taken from a cadaver upon which the method was performed, shows the incision made through the skin, muscle and periosteum. The incision through the skin and muscle is exactly shown in

the drawing. I do not find it necessary to complete the omega cut, as the lower straight part of the omega incision is unnecessary. The incision through the periosteum is shown in this drawing, except at the extremities of the incision. Here the periosteal incision converges upon each extremity beneath the muscular flap for about one-half a centimeter so as to cause a cleavage in the bone when elevated. This part of the periosteal incision is made by retracting the skin and muscle flap slightly upon each side. The point at which the periosteal incisions converge is just at the level of the zygoma.

Fig. 5 shows the manner of holding the chisel in cutting the groove. This is done in one continuous motion, with the lower chisel at first, and cutting to the vitreous plate in all parts of the groove. The smaller chisel, which exactly fits in the groove of the larger one, is used to cut through the vitreous plate above. At the upper portion of the groove the larger chisel is used in cutting the vitreous for a space large enough to insert the elevator. At the extremities of the periosteal incision the smaller chisel is used with great care so as to cause an even break in the bone.

In Fig. 6 the fragment has been elevated and turned down, showing the dura mater with the middle meningeal artery and the groove in the parietal bone for the artery. The middle meningeal artery is tied here, if injured by being torn out of the groove.

In Fig. 7 the flap has been turned down, and the periosteum has been loosened below the level of cleavage in the bone. The bone thus bared has been removed with cutting forceps (about one centimeter in width) to below the level of the zygoma and nearly on a level with the floor of the fossa. The dura mater has been separated with the finger from the floor of the fossa, and the brain and dura have been raised by a retractor, exposing the nerve on the floor of the fossa.

The third, fourth, sixth and first divisions of the fifth nerve have been retracted to show the cavernous sinus. The second and third divisions are seen to the outer side, and at the posterior extremity of the sinus.

Behind the third division is seen the middle meningeal artery in the foramen spinosum. At the point of convergence of the three divisions of the fifth nerve and beneath them is the carotid artery. It is not seen in the drawing, nor was it obtained in the photograph from which the drawing was taken.

It is at this stage that the second and third divisions are cut at the foramen rotundum and ovale. The next step is to fasten these ends with forceps, and while using slight traction to divide the sheath upon the superior aspect at its attachment to the dura, forming the Cavum Meckelii. The ganglion is now loosened from the superior wall with a very small spoon and removed. The sheath of the nerve is finally divided upon its inferior aspect at the outer border of the cavernous sinus and carotid artery.

Fig. 8 is a drawing taken from a photograph upon the same cadaver to show the relation of the third, fourth, sixth, and first, second and third divisions of the fifth nerve. In this drawing the brain was removed in order to obtain the view from above.

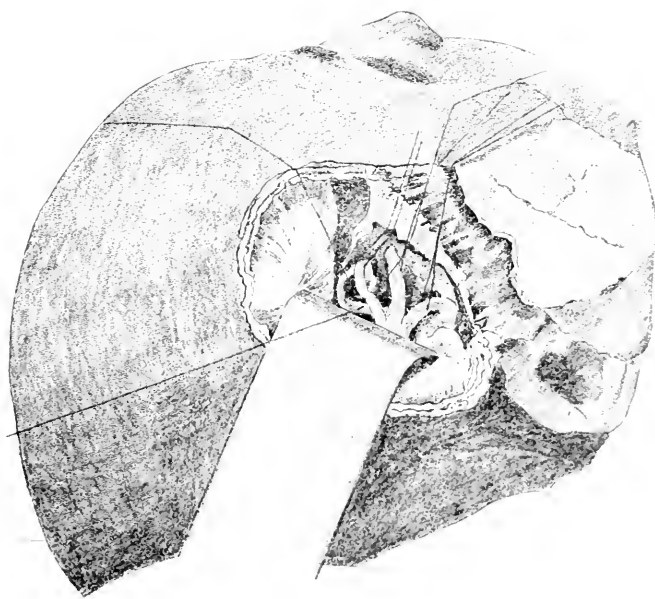


FIG. 7.—Brain and dura retracted, showing structures on the floor of the fossa.



FIG. 8.—Showing the relations of the third, fourth, fifth and sixth cranial nerves.



# OBSERVATIONS ON THE MECHANICAL AND OPERATIVE TREATMENT OF HERNIA AT THE HOSPITAL FOR RUPTURED AND CRIPPLED OF NEW YORK.

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**D**URING the two years ending September 30, 1892, 9250 cases of hernia, or affections simulating hernia, were treated at the Hospital for Ruptured and Crippled. While the treatment carried out at this institution has been in the main mechanical, a certain number of cases in children have been subjected to operation. Adults requiring operative treatment have been referred to other hospitals. Of the total number, 9250, 8033 were cases of actual hernia, while 1115 more or less closely resembled hernia.

The different varieties of hernia were represented in the following order of frequency :

	M.	F.	Under 14.	R.	L.	D.
Inguinal . . . . .	6757	6000	760	1802	3164	1746
Umbilical . . . . .	673	246	327	359	. .	. .
Femoral . . . . .	474	171	303	8	272	146
Ventral . . . . .	138	61	77	5	. .	. .

*Mechanical Treatment.*—The general plan of treatment in all reducible cases, except umbilical and ventral, is support by means of a steel spring truss as light as consistent with the effective control of the hernia. The form of truss generally employed is that known as the "Knight truss," so called from Dr. Knight, the founder of the hospital. It differs from most of the trusses in common use in being an "opposite side" truss, the spring extending but three-fourths the distance around the

pelvis and applied to the sound side, being held in place by a strap connecting the two ends of the spring. (See Fig. 1). The spring is made of imported steel, and so tempered that it can be sufficiently bent to fit the individual case. It is covered with thin rubber tubing, and from one end projects at right angles a steel shank two inches long to which the pad is fastened. This is made of soft wood, round,  $1\frac{1}{2}$  to 2 inches in diameter, and is covered with several thicknesses of flannel and one of chamois skin.

For children, a hard wood polished pad is preferred, and leather or cloth is used for the covering of the spring. In a few cases the opposite side celluloid truss is employed. Some variation in the size and shape of the pad is required in exceptional cases, and the perineal straps have to be added occasionally to keep the steel band down and maintain the pad continuously over the orifice of the rupture. The direction of the pressure exerted by the pad is also varied to suit the case by bending the shank, which fixes the pad on the spring, or by twisting the spring itself.

In fully 75 per cent. of the cases this truss gives satisfaction. Its application is easy, its construction cheap. The latter consideration is of importance, since, roughly speaking, 50 per cent. of the cases treated are unable to pay the cost of the instrument. With proper care it often renders efficient service for two or three years without repair, and in some cases much longer.

In the smaller percentage of cases, when retention is difficult from various causes, or when patients desire a more expensive apparatus, the celluloid truss of the "frame" or "Hood" pattern (Fig. 2) is used. This is unquestionably the most comfortable form of truss, but it is too expensive for general use in this institution.

When from neglect or other causes the hernia has become large and unmanageable, and the patients are not fit subjects for operation, use is made of the scrotal bag, made of strong material and supported from the shoulders.

*Umbilical Hernia.*—Of the 673 cases of umbilical hernia, 359 occurred in children under fourteen years of age. The method employed in treating children under two years of age is to place over the opening a wooden button, which is kept in place by a strip of rubber plaster completely encircling the



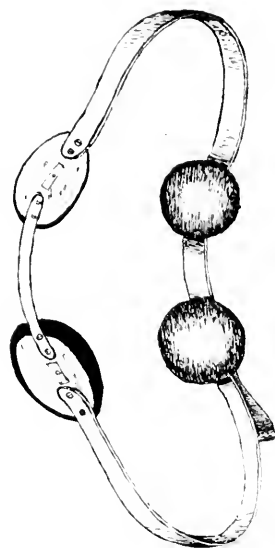


FIG. 2.—Frame truss—hood.

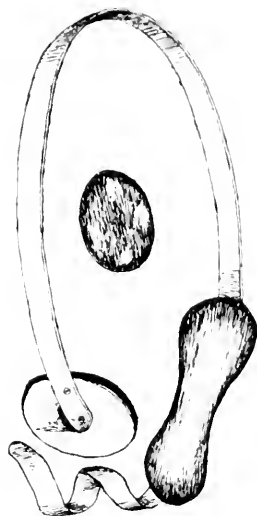


FIG. 3.—“Opposite side,” or “cross body” truss, with pad on end for inguinal hernia.

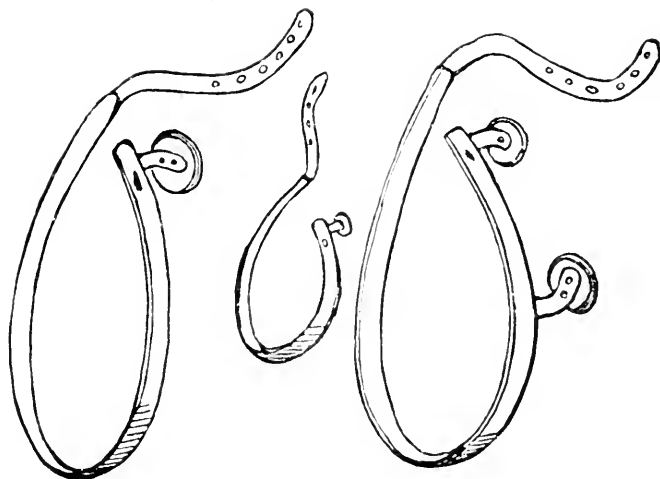


FIG. 4.—The “Knight” truss; single and double.



abdomen. This is allowed to remain a week or ten days, when fresh plaster is applied. In children it has been found impossible to keep any form of belt in place, although the belt is the routine treatment in the adult cases. Each belt is provided with a pad varying in shape and size. When reducible, a pad is always used under the belt. A large proportion are irreducible in whole or in part, and some of these are more comfortably supported by the belt alone, with the intervention of a soft cloth to prevent friction.

The omentum is more frequently the irreducible part. If in addition to this a portion of intestine, which is reducible, forms the contents of the sac, it is found possible to control the latter with a pad, while the former requires only the support of the belt.

It is exceptional to find patients even with irreducible omentum in umbilical hernia complaining of more than discomfort, and this is relieved by proper support. There has not come to our knowledge during the past two years a single case of strangulation. It seems, therefore, as if the danger of this condition had been exaggerated by the surgeons who advocate operation. It is, however, a situation that should be carefully watched, and patients should be warned of the significance of the symptoms of obstruction of the hernia, and the necessity of prompt action in threatened strangulation. The risks and the value of surgical operations in this form of hernia have not, up to the present time, been determined by any large experience.

*General Results of Mechanical Treatment.*—It has been the custom of some enthusiastic, and perhaps over-sanguine, advocates of "radical cure" methods, to assert that few or no herniæ can be cured without operation, while, on the other hand, some men of large experience in the mechanical treatment claim that most cases can be cured with a right kind of a truss. As is often the case, the truth probably is to be found midway between these two extremes. It must be admitted that a certain number of favorable cases, especially in children and young adults, are cured, and permanently cured, by wearing a truss for a longer or shorter term. Just what percentage this is it is very difficult to say. It is also true that a larger number of cases are found in which

the hernia is perfectly controlled by a truss, with but slight, if any, inconvenience to the wearer. There remains another class of cases in which the truss fails to hold completely on account of adherent or irreducible omentum. That this condition is by no means infrequent is shown by the fact that 298 cases were observed at the hospital during a single year. An analysis of these cases shows that 205 occurred in adult males and 93 in women and children.

The diagnosis is not, as a rule, difficult, though some cases so closely resemble other affections as to make a very careful examination necessary. The slip of adherent omentum, if reducible, can be made to reappear by gentle traction on the cord. This is sometimes difficult to differentiate, especially in children, from hydrocele of the cord, yet if we bear in mind the fact that adherent omentum is infrequent in children, and that hydrocele of the cord is common, and in addition that the latter condition has a peculiar elastic feel, mistakes will seldom be made. If doubt exists, it can be easily settled by a fine hypodermic needle.

If the omentum has been irreducible for a longer or shorter time, it may so closely simulate an adenitis that the diagnosis is extremely difficult. One case was seen at the hospital where a mass of adherent omentum the size of an English walnut had remained in the femoral region for five years. It had become red and painful on two occasions, but had caused no serious trouble. It so closely resembled an adenitis that the latter diagnosis was made by a large number of physicians and surgeons. Operation showed it to be a mass of omentum which had undergone cystic degeneration at its centre, leaving a cavity one-half an inch in diameter. In making the diagnosis the crural and inguinal openings should be carefully sought for. In adherent omentum, the tumor is usually single; in adenitis, several nodules may be made out. The history of the case, if it can be obtained with accuracy, will also throw light upon the diagnosis.

The treatment of this class of cases by mechanical means is but seldom satisfactory, and in the majority of cases positively harmful. Even in the milder cases, the slip of omentum being adherent to the sac, prevents perfect reduction, and renders the

wearing of a truss inefficient and frequently painful. In the severer cases, where the omentum is irreducible, the truss is still more objectionable.

The majority of these cases unless contraindications, *e. g.*, the age of the patient, or the presence of some other disease, exist, we believe should be treated by operation. With proper precautions there is but little risk, and even if relapse should occur a truss could be worn with much greater comfort and effect. During the past year upward of forty of these cases have been operated upon.

*Hernia in Children.*—2174 cases occurred in children under the age of fourteen. Of these 1802 were inguinal, 359 umbilical, 8 femoral and 5 ventral. Most of the cases are treated by spring truss, similar in form to that already described (Knight). In children under the age of one year the worsted or so-called “hank” truss has been extensively tried. This truss has been very highly praised by some, and as strongly condemned by others. During the past year an attempt has been made to give it an impartial trial, and alternate cases up to the age of one year were treated by the “hank” and the light spring truss. The results in 240 cases carefully followed up led us to discard the “hank” truss as a routine method of treatment, although there are still a few cases, *e. g.*, very young and ill-nourished infants, where it fills a useful but temporary place.

The results of almost every variety of mechanical treatment are far better in children than in adults, and the proportion of *permanent* cures is much greater, yet even in children there is a considerable number where no form of truss avails, and an operation offers the only prospect of cure, to say nothing of comfort and relief.

Such cases may be grouped as follows:

1. Cases of adherent omentum.
2. Cases of hernia complicated with reducible hydrocele.
3. Cases of irreducible and strangulated hernia.

With certain surgeons of high authority we may add another class, *viz.*, all cases which from various reasons are unable to command the large amount of care requisite for successful mechanical treatment.

*Operative Treatment.*—Hernia in children has long been regarded by the majority of physicians and surgeons as unsuited for operative treatment, and mechanical treatment has been persisted in even when known to be accomplishing nothing. This view is probably due to the somewhat general impression that most children get well without regard to whether the truss holds or not.

Careful observation shows that this is not true, but that many cases reach the age of fourteen years, having worn a truss from infancy, not only without cure, but with little prospect of cure.

Again, the operation is considered more dangerous in children than in adults on account of the difficulty of keeping the wound aseptic. Experience has shown this fear to be groundless.

During the past fifteen months, at the Hospital for Ruptured and Crippled, there have been operated upon forty cases, ranging between the ages of eight months and fourteen years. There has not been a single death, and in thirty-eight cases absolute primary union was obtained.

In nearly all cases the children were up and around the ward at the end of two and a half weeks, and left the hospital at the end of three weeks. The method employed in the majority of cases was the Bassini (in thirty cases). The Czerny-Risel method was used in nine cases. The remaining case was a *femoral* hernia, occurring in a boy seven years of age. The sac was ligated and the femoral canal closed with a "purse-string" suture of kangaroo tendon. The kangaroo tendon was also used in nearly all of the buried sutures in the Bassini operation, and it has given the greatest satisfaction. The wounds have all healed by first intention, and there has been no tendency to the formation of sinuses as frequently occur when silk is used, and to a less extent with silkworm gut. The kangaroo tendon and the ox peritoneum seem to fulfill all the requirements of a buried suture in a hernia operation. These sutures are soft and pliable, and remain unabsorbed a period of three months or longer, as shown by the experiments of Ballance and Edmunds.<sup>1</sup> This

<sup>1</sup> *Ligature of Arteries in Continuity*, 1892.



FIG. 4.—Irreducible umbilical hernia with excoriation.



FIG. 5.—Ventral hernia following operation for a umbilical





period is sufficiently long to assure a thorough agglutination of the parts without the necessity of confining the patient to bed for six or seven weeks.

*Wound Treatment.*—No drainage has been employed (with the exception of one case), and the results amply prove that it is unnecessary. In addition to the usual antiseptic dressing of iodoform and sublimate gauze, a light plaster-of-Paris casing is applied from the umbilicus to the ankle. To this measure is undoubtedly due to a large extent the prompt healing of the wound, since it insures the parts absolute rest. This casing is left on for eight days, when the wound is dressed for the first time, catgut being used to close the external wound. The stitches do not require removal, and the dressing can be postponed even longer if desired. After the first dressing an ordinary spica bandage is all that is required.

*Final Results.*—As the cases have all been operated upon during the past fifteen months, it is too early to estimate the number of permanent cures. The cases have been kept under constant and careful observation, and have nearly all been recently seen. Two relapses have occurred, one following a Czerny operation, the other a Bassini. Both failures were due to faulty technique. Silk sutures were used in both cases, and suppuration occurred to such an extent in the Bassini case that the sutures sloughed out and left no support to the canal. The Bassini operation was performed for the recurrence from the Czerny method, and the patient was seen a few days ago (nine months after operation) with not even an impulse at the site of the hernia. It is worthy of note that both relapses occurred within three months after operation.

*Observations on Hernia Relapsing After Radical Cure Operations.*—A number of patients applying for trusses have given histories of operations for radical cure. These statements have been confirmed by consulting hospital records, or by communicating with operators, and the method and immediate result as to wound healing have been accurately recorded in all but ten cases. The result of this investigation is summarized in the following table:

TABLE I.—HERNIA RELAPSING AFTER VARIOUS OPERATIONS.

Method.	No. of Cases.	Nature of Hernia.	AGE.		HOSPITAL TREATMENT.				RELAPSE.			Remarks.
			Elderly.	Youngest.	Average.	Longest.	Shortest.	Average.	Longest.	Shortest.	Average.	
Czerny.	3	Inguinal.	50	10	30	5 wks	3 wks	4 wks	6 mos	1 mo	3½	No Truss.
Macewen.	5	1 irreducible.	50	31	36	16 wks	6	41	4½ yrs	4 mo	2½ yrs	Truss.
Socin.	5	2 irreducible, 3 reducible.	68	9	34	8 wks	9 days	3½ wks	2 yrs	2 wks	11 mos	1
McBurney.	15	3 strang. 12 non strang	58	18	39	10 wks	3	6½	2 yrs	1 mo	8 mos	2
Bassini.	2	1 irreducible Sigmoid.	39	14	26	8 wks	7	7½	7 mos	3½ mos	5 mos	One case suppurated, other in sigmoid hernia and operation imperfect.
Heston.	1	Reducible.	52									
Bryant.	1	Strang.	52			8 wks			5 mos			1
Ball.	1	Irreducible.	60			6 wks			18 mos			
Suture of pillars; sac not found.	1	Reducible.	19			3 wks			1 wk			
Suture of pillars, with silver wire left in 3 weeks.	1	Inguinal.	45			3 mos			2 mos			1
Suture of sac; sac not removed; suture of con- densed catgut.	1	Left inguinal Sigmoid.	53			17 days			1 mo			Sigmoid hernia; large irreducible.
Unknown.	10	Inguinal.	70	18	36	8 wks	4 wks	7½ wks	2 yrs	2 mos	6 mos	2
Femoral.	9	6 strang, 2 irreducible.	61	30	48	7	2	6	5 mos	2 wks	3 mos	

Here are 56 cases operated upon by 11 different methods or modifications. These, added to a similar series of cases already reported, covering the observations of Dr. Bull and Dr. Milliken for three years,<sup>1</sup> make a total of 137 operations for radical cure. The methods most numerously represented are those of Heaton in 10, Czerny in 25, Socin in 10, McBurney in 39, Macewen in 9, and Bryant in 2 cases. In 18 the method is unknown. Relapse has occurred at periods varying from a few weeks to 4½ years (a case operated upon by Dr. R. F. Weir by Macewen's method). These relapsed cases have little bearing on the question of comparative reliability of different procedures. They probably represent but a small proportion of those operated upon, and it is natural that the method most frequently found defective should be that which has been most in vogue in this vicinity—the "open method." But the constant appearance of patients in whom the attempt to cure has failed must have the effect of diminishing one's confidence in the ultimate results of the radical cure method employed. The propriety of operation has been amply justified by its slight mortality and its incontestable benefit in cases of strangulated and irreducible hernia. Even after relapse the majority of these patients find themselves better than before the operation. The reappearing protrusion is smaller than the original rupture, and a truss is worn with greater comfort. An exception is to be noted only in a few cases of relapse after the open method, or in those where after other procedures prolonged suppuration has followed. The cicatrix resulting in this class of patients tends to grow softer and more yielding, and has been found so thin as to permit intestinal movements to be plainly seen. Subjected to the weight of the viscera from within, and the presence of the truss without, it is in a predicament most compromising to its vitality. Under these conditions the patient cannot be said to have been benefited by the operation, except when done for strangulation. These considerations lead to the conclusion that all "open methods" or operations, after which the wound is left to heal by granulation, should be discarded, and that *the* feature of every operation

<sup>1</sup> N. Y. Medical Journal, May 30, 1891.

which is to give satisfaction should be rapid *primary union*. If this latter statement be accepted, we should further discard all methods in which foreign bodies, even though aseptic, silk and silver wire, for instance, are buried in the wound.

*Reported Results of Operations for Radical Cure.*—As an offset to the disappointment excited by the observation of these relapsed cases, it is well to contemplate the results reported by individual operators. (See Table II.)

The study of the accompanying tables will show that general progress has been made, and that certain methods are entitled to be adopted until replaced by those with a still better showing. Thus we find that Bassini<sup>1</sup> has operated upon 262 patients with 1 death; that 239 patients (or 247 operations) were traced, that 47 were without relapse after two years, and that 108 had no recurrence for periods varying from 1 to 4½ years after the operation.

Championnière<sup>2</sup> has operated upon 275 cases, with 2 deaths; 112 have been kept under observation; 30 have gone 2 years without relapse, and 11 have remained solid for 4 years and over.

In view of these results Bassini's method has been practised during the past year by Dr. Bull, at the New York Hospital, and by Dr. Coley, on children, at this hospital (Hospital for Ruptured and Crippled) 30 cases. Dr. Coley has, furthermore, operated upon 12 cases by this method outside of this hospital.

Up to the present moment there have been no deaths and an insignificant proportion of relapses, 1 in over fifty cases. This method was first adopted in this country by Dr. R. F. Weir.

Another year or two will permit some conclusions as to the proportion of relapses, as the patients are all being kept under observation. Even now we have some data for comparing the operation with the older methods, in children at least, for in 1889 and 1890 16 children were operated upon at the Hospital for Ruptured and Crippled by the Socin and Czerny methods. Of these 6 relapsed the first year and 2 others later. Of Dr. Coley's 40 cases of children (3 operated upon during 1891) 30 were

<sup>1</sup> Archiv. f. klin. Chirurg., 1890.

<sup>2</sup> L. Championnière: Radical Cure of Hernia. Paris, 1892.

TABLE II.—METHODS AND RESULTS OF OPERATIONS FOR THE RADICAL CURE OF HERNIA.

Operator—Reference.	No. of Cases.	Nature of Hernia.	Condition.	Mortality.	Number of Relapses.	Truss.	No. Sound After 2 Years.	No. Well After 1 Year.	Remarks.
Banks, Mitchell, Brit. Med. J., Dec., 1887.	106	88 inguinal, 18 femoral.	68 reducible, 38 irreducible and strang.	4 died; 3·7 per cent.	18 relapsed, 66 traced; 26 per cent.	Most cases.	31		6 cases well after 5 years.
Barker, Brit. Med. J., 1890.	50		1		8, 38 traced; 21 per cent.				Period of observation 20 months. 20 cases under 10 years.
Pall.	22				3				
Socin.	147		75 reducible, 85 incarcerated.	2 died, 28 per cent; 11 died, 13 p.c.	133 traced.				
Billroth's Klinik, Haidenhain Archiv. Chir., 1890.	136	83 inguinal, 45 femoral, 8 umbilical.	93 reducible, 40 in cure.	6¼ p.c. in reducible cases.	34 traced, 10 relapsed; 32 per cent.				3 recurred 5 years after operation; 1 6 years after.
Championnière, Cure Radicale des Hernies Paris, 1892.	275		All reducible.	2 died; 8 p.c.	112 traced, 14 relapsed; 12 per cent.	Few cases.	30		11 well 4 years after operation.
Bassini, Archiv. f. klin. Chir., 1890.	262	Inguinal.	non-strang 251, strang 11.	1 died tenth day of pneumonia.	239 cases = 247 operations traced; 7 recurred.	Few.	47		108 well 1 to 4½ years after operation.
Macewen, Brit. Med. J., 1888, No. 10.	81	65 inguinal, 15 femoral.	51 reducible, 29 strang.		1	Few.	10		
Escher (Hassini's op.) Arch. f. klin. C., 1892.	53		48 reducible, 5 strang.	4 died.	31 traced, 3 relapses.				

Operator—Reference.	No. of Cases.	Nature of Hernia.	Condition.	Mortality.	Number of Relapses.	Truss.	No. Sound After 2 Years.	No. Well After 1 Year.	Remarks.
Kocher, Ann. of Surgery, Dec. 1892.	119			1 died.	94 traced, 20 recovered; 21 per cent.	Few cases.			
Marey, H. O., Hernia, 1892	112				78 traced, 4 relapses.	No truss.			Time of observation not given.
McBurney, "Open Method."	36		36 reducible		1		1		14 cases observed less than 6 months.
Halstead, Johns Hopkins.	57				No relapses.				
Poore, C. T., N.Y. Med. J., 1892.	24				1		13		All in children; 19 open method, 4 Macewen.
Wood, Archiv. f. klin. Chir., 1890.	330			7 died; 2 per cent.	20 per cent.				
Park Roswell.	118								
Pull, W. T., Med. News, 1890, p. 8.	209			(2) in non-strang. cases.	118 traced, 44 relapses.	Most cases.			
Coley, W. B.	60	4 femoral, 5 caecal, 56 inguinal.	5 strang, 7 irreducible, 48 reducible.	None in non-strang, 1 in strang.	54 traced, 2 relapses.	Most cases. (Temporary).			39 in children under 14; Bassini operation in 42 cases.
Total.	2197			Mortality in non-strang. cases 23 cases = 1 per cent.			132		

operated upon by Bassini's method. But 1 of these cases has relapsed, and in this case (the first) there was prolonged suppuration.

*Ventral Hernia Following Abdominal Section.*—Sixty cases have applied for relief for ventral hernia following various abdominal operations. An attempt has been made to analyze these cases with a view of ascertaining the conditions upon which a failure to obtain a permanent closure of an abdominal wound chiefly depend. Although careful histories have been taken of all the cases, much necessary data has not yet been obtained, and for the present at least we must content ourselves with a few general observations. Of the 60 cases 9 followed operations for appendicitis; 3 Alexander's operation; 1 suprapubic cystotomy; 1 ligature of external iliac artery. The length of the incision varied from two to eight inches, and in a general way it may be said that the size of the hernia corresponds to the length of the cicatrix. The wound healing has also an important bearing upon subsequent hernia.

In a large number of the cases the wounds healed by granulation; and in cases where primary union occurred the herniae were much smaller. In nearly all the cases of appendicitis the wound healed by granulation, as shown by the wide cicatrix.

In one case of hernia following an operation for appendicitis strangulation occurred.

*Miscellaneous Cases.*—The cases worthy of special note are the following:

(1) Hydrocele of the canal of Nuck. Nine cases were observed during the year.

Hydrocele in the female is sufficiently rare to make these cases worthy of a full description were it not for the fact that they have been referred to in detail in a recent monograph on the subject.<sup>1</sup>

(2) Properitoneal hernia. One case. This variety of hernia is comparatively rare, not more than one case being seen in a year, or about one in 5000 cases. The causes that give rise to it

<sup>1</sup> Hydrocele in the Female, with a Report of Fourteen Cases. By W. B. Coley. ANNALS OF SURGERY, July, 1892.

may be several, but the most frequent and important is a partially descended testis. Of four cases seen by the writers this was present in three, while a hydrocele of the canal of Nuck constituted a similar factor in the fourth.

The accompanying photograph shows the external appearance in the present case. The right half of scrotum was empty, but by pressure on the tumor in the inguinal, or rather the iliac region, the testis, of one-half the size of the left, could be made to emerge from the external ring. The tumor was as large as two fists, and extended upward and outward half way from the internal ring to the anterior superior spine, and hung over Poupart's ligament. It was dull on percussion, semifluctuating, and but a small portion reducible. The operation (which was done at the New York Hospital, by Dr. Bull) showed the sac spread out above the internal ring, with the external ring widely dilated. The tunica vaginalis extended just beyond the external ring, and the testis was found opposite the pubic bone. Three-fourths of the entire omentum was found in the sac, but there was no bowel present. There were no adhesions, but the omentum reduced with difficulty, because the neck of the sac was long and narrow, its body being expanded. The omentum was removed and testis likewise, and the wound closed by Bassini's method.

The diagram shows the relation of the sac, external and internal ring and testis. For a further description of this form of hernia, with a report of two cases treated by operation, see Clinical Report of Operative Surgery, in the service of Dr. William T. Bull.<sup>1</sup>

*Multiple Hernie.*—The largest number of hernie observed in a single individual was five, two inguinal, two femoral and one umbilical. What makes the case still more interesting, is the fact that four of the hernie had been operated upon by three different methods. One had recently relapsed (Macewen's operation).

*Maldescent of Testis.*—Four cases of testis in the perinæum were seen during the past year. All occurred in young infants, and no operation was advised until the patients were older.

*Femoral Hernia in Children.*—This variety of hernia is

<sup>1</sup> W. B. Coley: N. Y. Med. Jour., 1890.





FIG. 6.—Pro peritoneal hernia with undescended testis.

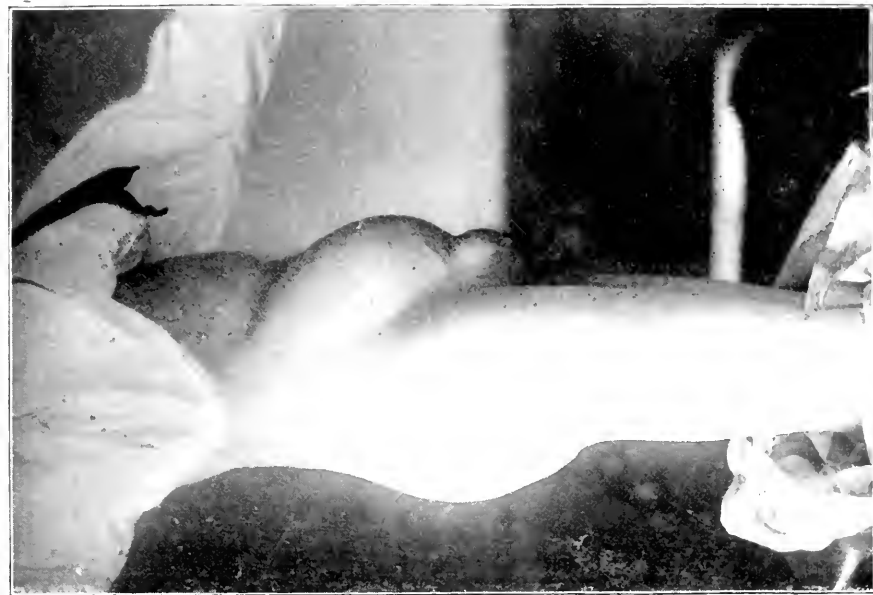


FIG. 7.—Inguinal ventral, (Horn glass beam.)



seldom seen in children under the age of fourteen years, but it is not so rare as many writers on hernia would have us believe. During the past two years 8 cases were treated at this hospital, and during a single year (1892) 5 cases were observed under twelve years. One occurred in a boy of seven years, and was associated with an inguinal hernia on the opposite side. Another was seen in a girl of six years, and a third in a girl of five years.

The accompanying cut shows a large inguinal hernia, coexisting with a ventral protrusion, emerging on the outer side of the rectus muscle.

The object of these brief notes has been to give as concisely as possible the chief points of interest and importance gleaned from the observation and treatment of these 9000 cases of hernia.

# THE RADICAL CURE OF INGUINAL HERNIA IN THE MALE.<sup>1</sup>

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Just now most of the so-called radical-cure operations are under a cloud. They have not withstood the test of time. Modern text-books of surgery refer to operations for the radical cure of hernia with more or less misgiving. The newest American surgery<sup>2</sup> disapproves of operations for the radical cure of reducible hernia if a truss can be worn, and believes that Czerny's method is as good as any, should an operation be necessary.

The most telling blows against radical-cure operations in this country have been dealt, perhaps, by Bull. His papers on the radical cure of hernia and on relapses after the various operations for the radical cure of hernia have produced a profound impression on both practitioners of medicine and practitioners of surgery. Bull concludes the first of these papers<sup>3</sup> as follows: "These observations will, without doubt, be duplicated in the cases yet to be traced, and go to strengthen the conviction that all methods of radical cure will be found unsatisfactory." In his second paper<sup>4</sup> he writes: "I hold, after the knowledge of these failures, and in view of the well-established fact that after the old operations for hernia recurrence has been often long delayed, that it is wise to drop the term *cure*, and to estimate the value of given procedures by the relative proportion of relapses."

From 1883 to 1885 Bull operated for the cure of hernia

<sup>1</sup>Read at the Annual Meeting of the Medico-Chirurgical Faculty of Maryland, at Easton, Md., November 17, 1892.

<sup>2</sup>An American Text book of Surgery. Keen and White.

<sup>3</sup>Bull: On the Radical Cure of Hernia, with Results of One Hundred and Thirty Operations. Medical News, 1890.

<sup>4</sup>Bull: Notes on Cases of Hernia which Have Relapsed after various Operations for Radical Cure.

chiefly by what he calls Socin's method—ligature and excision of the sac. From 1885 to 1889 he employed what he calls Bank's method—ligature and excision of the sac, with suture of the pillars of the external ring. Since 1889 he has practiced the sewing up of the canal after ligating and excising the sac.

Of the cases operated upon by the first method, at least 27.27 per cent. relapsed within one year; of those operated upon by the second method, at least 40 per cent. relapsed within one year; and of those operated upon by the third method, at least 42 per cent. relapsed within one year.

"My own results," writes Bull, "as to relapse being no better by the complicated method of suture of the ring alone, or of the ring and canal, than by the simpler method of excision of the sac after ligature, I shall confine myself to that method of operation till other procedures, which have stood the test of years, make a more promising showing." Bull's results became less promising the longer he observed his cases. From a series of one hundred and thirty-six cases there remained only four which had been over four years without recurrence. In his second paper Bull says: "Now that ten years have elapsed since the modern radical operations have been in vogue, we ought to hear of, or have presented to us, patients who have been more than five years, at least, without relapse. We could naturally expect to see such cases occasionally at a special hospital. But there are none such." Notwithstanding these facts, Bull does not advise that operations for the relief of hernia be discontinued, nor does he wish to discontinue efforts to discover more satisfactory methods for its cure. For, of the cases operated upon, almost all were relieved for a time, and some for several years; and of the cases which had relapsed, the majority were more comfortable than they had been before they were operated upon.

These are admirable papers, and faithfully depict what is to be expected if a hernia is operated upon by the methods which Bull has employed. To-day, therefore, the majority of surgeons operate for the radical cure of hernia only when the hernia is strangulated or cannot be retained with a truss. A few believe

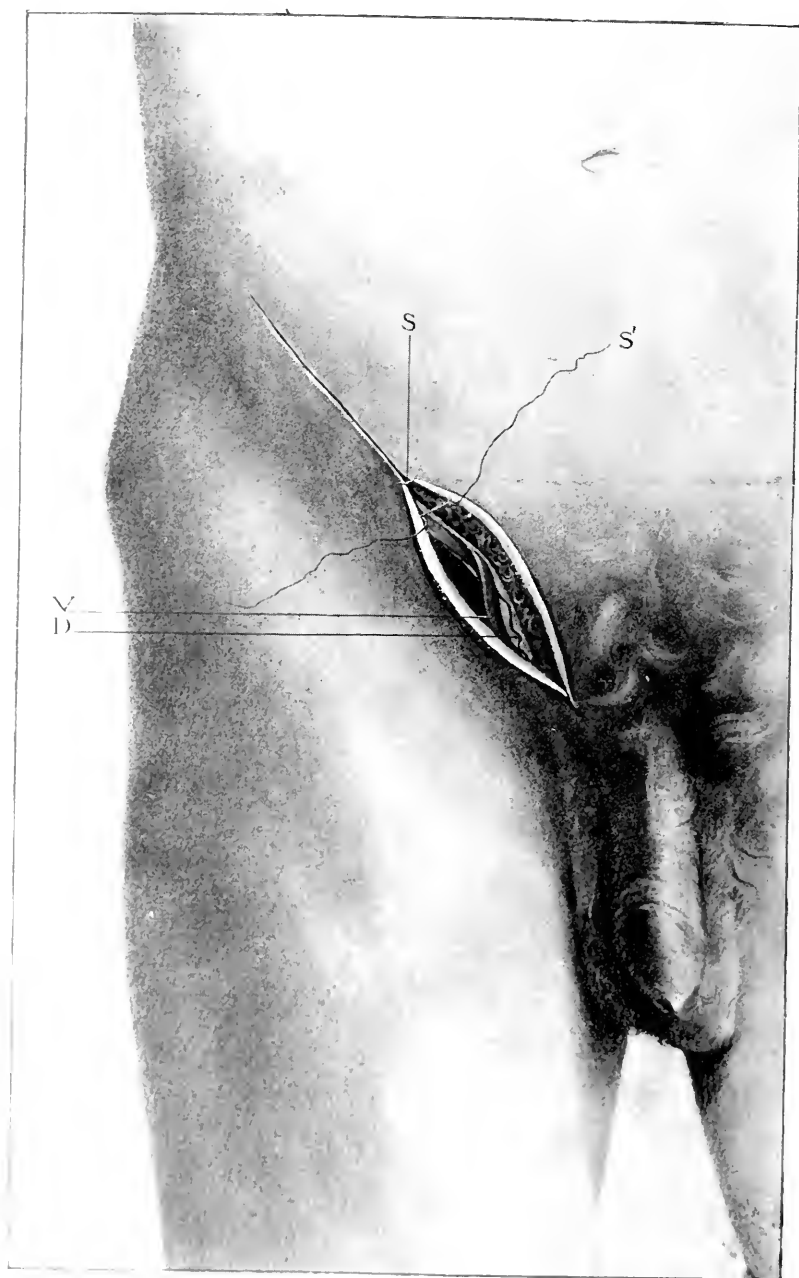
that they have had results good enough to justify their operations upon almost every case which presents itself.

More than three years ago I described a new operation for the cure of inguinal hernia in the male.<sup>1</sup> Six or eight months later, Bassini, of Padua, published his operation for cure of inguinal hernia, which he had performed two hundred and fifty-one times, with only seven returns and no deaths except one, and that from pneumonia after the wound had healed. Bassini's operation and mine are so nearly identical that I might quote his results in support of my operation.

Instead of trying to repair the old canal and the internal abdominal ring as Macewen had tried to do, I make a new canal and a new ring. The new ring should fit the cord as snugly as possible, and the cord should be as small as possible. The skin incision extends from a point about 5 cm. above and external to the internal abdominal ring to the spine of the pubes. The subcutaneous tissues are divided so as to expose clearly the aponeurosis of the external oblique muscle and the external abdominal ring. The aponeurosis of the external oblique muscle, the internal oblique and transversalis muscles and the transversalis fascia are cut through from the external abdominal ring to a point about 2 cm. above and external to the internal abdominal ring. The vas deferens and the blood-vessels of the cord are isolated. *All but one or two of the veins of the cord are excised.* The sac is carefully isolated and opened and its contents replaced. A piece of gauze is usually employed to replace and retain the intestines. With the division of the abdominal muscles and the transversalis fascia the so-called neck of the sac vanishes. There is no longer a constriction of the sac. The communication between the sac and the abdominal cavity is sometimes large enough to admit one's hand. The sac having been completely isolated and its contents replaced, the peritoneal cavity is closed by a few fine silk mattress sutures, sometimes by a continuous suture. The sac is cut away close to the sutures. The cord in its reduced form is raised on a hook

<sup>1</sup> Bulletin of the Johns Hopkins Hospital, Vol. I, No. 1; Johns Hopkins Hospital Reports, Vol. II, Surgical fasciculus, No. 1.





1. The application of the superficial buried sutures.



out of the wound to facilitate the introduction of the six or eight deep mattress sutures which pass through the aponeurosis of the external oblique and through the internal oblique and transversalis muscles and transversalis fascia on the one side, and through the transversalis fascia and Poupart's ligament and fibres of the aponeurosis of the external oblique muscle on the other. (See Fig. 1.)

The two outermost of these deep mattress sutures pass through muscular tissues and the same tissues on both sides of the wound. They are the most important stitches, for the transplanted cord passes out between them. If placed too close together, the circulation of the cord might be imperiled, and if too far apart the hernia might recur. They should, however, be near enough to each other to grip the cord. (See Fig. 2.) The precise point out to which the cord is transplanted depends upon the condition of the muscles at the internal abdominal ring. If in this situation they are thick and firm, and present broad raw surfaces, the cord may be brought out here. But if the muscles are attenuated at this point, and present thin cut edges, the cord is transplanted farther out. The skin wound is brought together by buried skin sutures of very fine silk.<sup>1</sup> The transplanted cord lies on the aponeurosis of the external oblique muscle and is covered by skin only. (See Fig. 3.)

Bassini believes that he restores the inguinal canal to its physiological condition, inasmuch as he makes "a canal with two openings, an abdominal and a subcutaneous; furthermore with two walls, a posterior and an anterior, through the middle of which the spermatic cord passes obliquely." But the original canal is not by any means an affair so simple as Bassini's. To reproduce the equivalent, anatomically and physiologically, of the inguinal canal is, I believe, impossible. Moreover, we do not know that nature has made the best possible provision against hernia in providing, as it does, for the passage of the cord through the abdominal wall. Bassini's operation, although essentially the same as my operation, is different in some respects. 1. Bassini

<sup>1</sup> Instead of the interrupted buried skin suture, as shown in Fig. 3, we now use an uninterrupted skin suture without knots, which is withdrawn after two or three weeks.

always brings the cord through the muscles at the internal abdominal ring. The point out to which I transplant the cord is determined, as I have said, by the condition of the muscles. 2. Bassini does not excise the superfluous veins. I believe that it is advisable to reduce the size of the cord as much as is practicable. 3. In Bassini's operation the cord lies posterior to the aponeurosis of the external oblique muscle; in mine, between this aponeurosis and the skin. To secure for the cord the position which Bassini recommends, an additional row of stitches is required. Unless it should be demonstrated by a comparison of the results of the two methods that there is something to be gained by these additional stitches, it would be well for the sake of the wound and the operator to discard them.

Kocher thinks that the methods of Bassini and himself are to be preferred to other methods, Macewen's for example, because they (the former) enable the patient to get out of bed on the eighth day. I fail to see anything in the methods of Kocher and Bassini and myself which might enable the patient to get out of bed earlier than if he had been operated upon by the method of Macewen. The time to be spent in bed depends upon the judgment of the surgeon and not, open methods excluded, upon the particular method. Our patients are kept upon their backs for twenty-one days. Wounds thoroughly healed throughout per primam are not strong in eight days. One can easily tear open a typically healed wound which is not more than six or seven days old. Not long ago, in attempting to restore a club foot to its proper position, I accidentally and with very little force, pressed wide open a wound which had healed in the typical way, and was eight days old.

A wound is certainly stronger on the fourteenth day than it is on the seventh, and stronger on the twenty-first day than on the fourteenth. Just how long wounds of skin and muscle which have healed by first intention may continue to increase in strength we do not know. In our hernia wounds, the subcutaneous ridge of the aponeurosis and muscle which results when the parts have been brought together properly by buried mattress stitches does not disappear entirely for five or six or more weeks. I some-

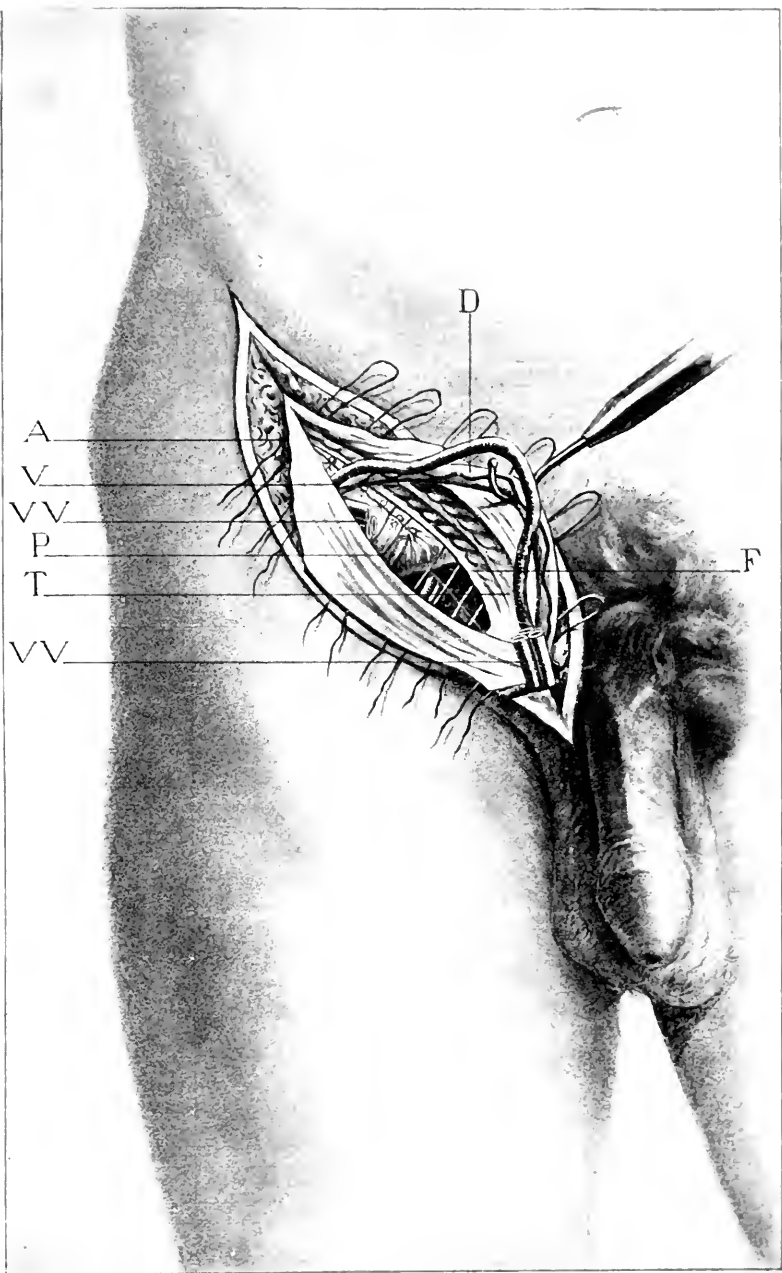


FIG. 1.—Inguinal canal laid open; sac cut away after suture of the peritoneum; elements of cord isolated and lifted up; deep mattress sutures introduced.

*A.*—Aponeurosis of the external oblique. *S'*.—Buried skin stitch, introduced but not tied.

*D.*—Vas deferens.

*T.*—Conjoined tendon.

*F.*—Fascia transversalis.

*V.*—Vein.

*P.*—Peritoneum.

*VV.*—Stumps of excised veins.

*S.*—Buried skin stitch, tied.



times question the propriety of allowing, as I do, my patients to walk about on the twenty-first day.

The technique of operations for the radical cure of hernia should be usually perfect, because we have to violate occasionally what I consider to be one of the most important principles of antiseptic surgery. We have to constrict the tissues somewhat with our deep sutures. It is not always possible to bring together the pillars of the external abdominal ring without a little tension. One can, of course, make relaxation cuts, but these would be quite as undesirable as a moderate amount of tension. Our hernia wounds illustrate admirably the danger of constricting tissues. We never resort to drainage of any kind for fresh wounds. And with the exception now and then of a hernia wound, none<sup>1</sup> of our fresh wounds suppurate. Inasmuch as we rarely, if ever, have occasion to constrict tissues in other fresh wounds, it is almost certain that the occasional stitch abscess in a hernia wound is due to tissue constriction plus, of course, the infection. To provide for a good circulation in every particle of tissue in and immediately about a wound is as much a part of our technique as are the ordinary antiseptic precautions. The better the circulation the less the likelihood of suppuration.<sup>2</sup>

Since the opening of the Johns Hopkins Hospital, three and one-half years ago, eighty-two operations for the radical cure of hernia have been performed, and without a death. Sixty-four of the cases were males, eighteen were females. Of the females, four had femoral, thirteen inguinal and one umbilical hernia. Of the males, sixty-three had inguinal and one femoral hernia. Five of the males were operated upon by Dr. Brockway by McBurney's method. Of these five cases two have recurred; two have

<sup>1</sup> Not more than one or two in a year. *Vide* Johns Hopkins Hospital Reports, Vol. II, Surgical fasciculus, No. 1.

<sup>2</sup> I have performed three amputations within a year and a half through tissues which were almost surely infected, and with instruments and hands which were as surely infected. No attempt was made to disinfect the wounds except that they were washed with a sterilized salt solution, and in one instance with warm water from the faucet. Great care was exercised in ligating and sewing and dressing to avoid constricting the tissues and to provide against tension. The wounds were closed as usual. They all healed absolutely by first intention.

not been heard from; and one, a boy two and one-half years old, is still well, twenty months after the operation. The cord in so young a patient is so very small that the hernia might be cured for several years by almost any method.

My operation, with or without modification, was employed in fifty-eight cases. Of the cases which healed per primam not one has recurred. The wounds which suppurated were immediately laid wide open and allowed to heal by granulation. For the result in such cases the open method, and not mine, is responsible. There have been six recurrences from methods not my own—Nos. 2, 12, 24, 27, 39, 52. No. 2 took cathartics and got out of bed a few days after the operation. He was discharged for insubordination on the eighth day, before his wound was firm. In No. 12 the cord was not transplanted. In No. 24 a stitch abscess formed several weeks after his discharge. There is a slight impulse, on coughing, at the site of the abscess. In No. 27 the wound suppurated. The stitches were removed and the wound was laid wide open and allowed to heal by granulation. This patient had a diffuse suppurative inflammation of the neck at the time of the operation. No. 39, the wound was opened for hæmorrhage and allowed to heal by granulation. No. 53, the wound suppurated, was laid open, and healed by granulation. The patient has a flabby abdominal wall. The scar has stretched throughout its entire length, and there is an impulse all along the scar on coughing.

#### STATISTICS OF OPERATIONS AT THE JOHNS HOPKINS HOSPITAL FOR THE RADICAL CURE OF HERNIA.<sup>1</sup>

1. W. H. R., aged eight. Large, right, congenital, inguino-scrotal, reducible hernia. Operation, June 6, 1889. Healed per primam. Last observation, January 6, 1891; the result is still perfect, two years after the operation.

2. G. H., aged twenty. Large, right, oblique, inguino-scrotal, reducible hernia. Operation, June 17, 1889. Healed per primam.

<sup>1</sup> A few cases have been added to this list since the reading of the paper.

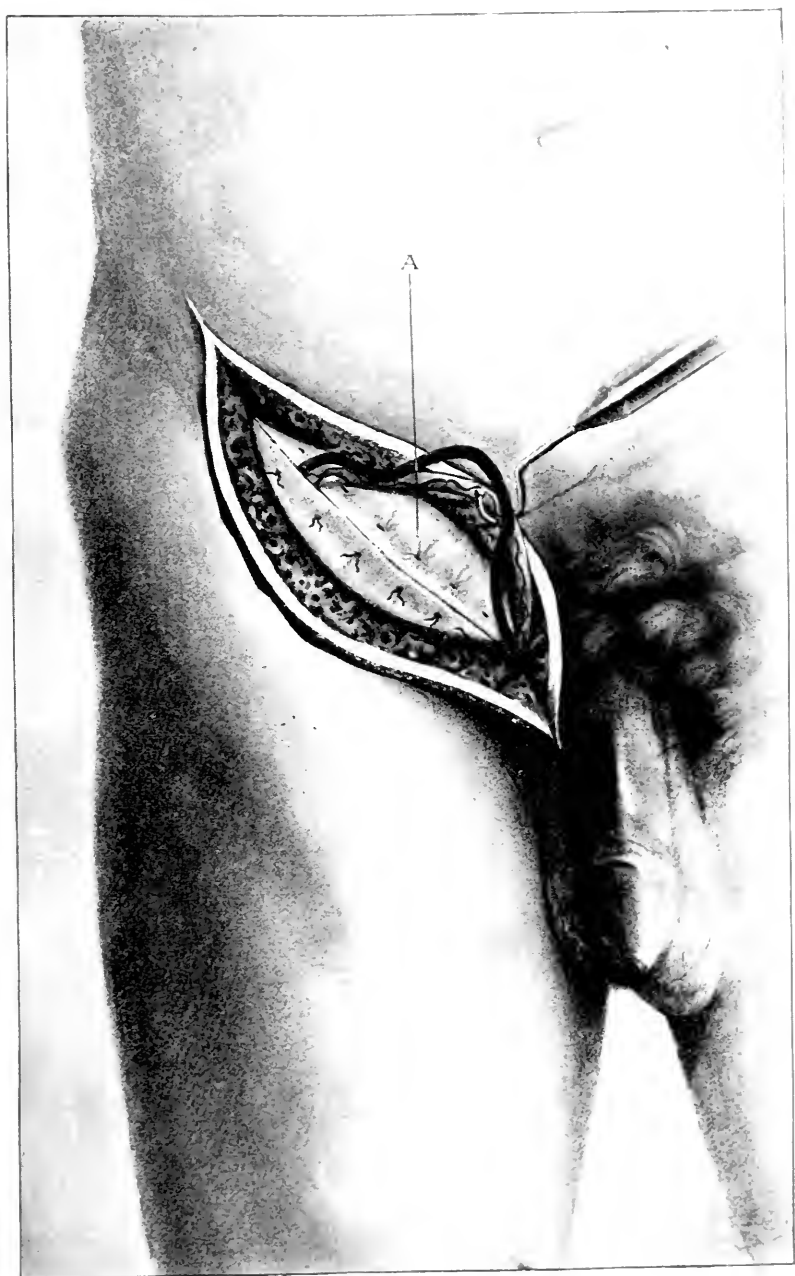


FIG. 2.—Deep sutures tied.





Discharged for insubordination, June 24, 1880. Patient got out of bed several times and took cathartic pills without permission. June 14, 1892, there is a complete return of the hernia.

3. J. B., aged forty-eight. Very large, right, oblique, inguino-scrotal, reducible hernia. Operation, August 16, 1889. The bladder was caught in one of the stitches, and the wound, consequently, was laid open and allowed to heal by granulation. Last observation, October 3, 1892; the hernia has not returned, two and one-half years after the operation.

4. M. E. L., aged fourteen. Small, right, oblique, inguinal, reducible hernia. McBurney's operation, August 8, 1889. Last observation, March 21, 1892; the hernia has not returned, two and one-half years after the operation.

5. J. D., aged eight. Small, left, oblique, inguinal, reducible hernia. Operation, September 10, 1889. Healed per primam. Last observation, May 3, 1892; result still perfect, two years and five months after the operation.

6. C. B., aged thirty-eight. Small, left, femoral, reducible hernia. Operation, November 10, 1889. Healed per primam. Discharged April 11, 1889.

7. E. F., aged seven. Small, right, congenital, inguinal, reducible hernia. Operation, December 10, 1889. Healed per primam. Last observation, March 3, 1892; result still perfect, two years five months after the operation.

8. J. W. F., aged twelve. Left, oblique, inguinal, reducible hernia. Operation, December 21, 1889. Healed per primam. Last observation, January 30, 1890; result still perfect. March 1, 1892, patient cannot be found.

9. S. McN., aged forty-six. Large, right, femoral, strangulated hernia. Operation, December 30, 1890. Discharged, February 2, 1891. Result unknown.

10. L. L., aged twenty-seven. Small, right, oblique, inguinal, reducible hernia. Operation, February 14, 1890. Open wound. March 21, 1892, the hernia has not returned.

11. H. S., aged thirty-seven. Large, right, inguinal, reducible hernia. Operation, February 2, 1890. Healed per primam. Last observation, December 1, 1892, linear scar; result still perfect, nearly three years after the operation.

12. G. G., aged twenty-eight. Large, left, oblique, inguino-scrotal, irreducible hernia. Operation, May 2, 1890. Cord not

transplanted. Healed per primam. October 14, 1890, the hernia has recurred.

13. J. H., aged thirty-nine. Small, left, direct, inguinal, reducible hernia. Operation, May 20, 1889. Healed per primam. Last observation, June 21, 1891, the hernia has not recurred.

14. E. H., aged thirty-five. Small, left, femoral, strangulated hernia. Operation, May 17, 1890. Discharged, June 22, 1890. Result unknown.

15. E. P., aged forty-five. Small, right, oblique, inguinal, reducible hernia. Operation, May 29, 1890. Healed per primam. Last observation, June 16, 1890, the hernia has not recurred.

16. H. B., aged eight. Small, right, inguinal, reducible hernia. McBurney's operation, July 17, 1890. Not heard from since discharged, August 23, 1890.

17. H. D., aged two and one-half. Right, inguino-scrotal, congenital, reducible hernia. McBurney's operation, July 17, 1890. Last observation, March 1, 1892, the hernia has not recurred.

18. A. E., aged five. Small, right, oblique, inguinal, reducible hernia. McBurney's operation, July 23, 1890. November 11, 1890, the hernia has recurred.

19. G. W., aged forty-five. Small, right, oblique, inguinal, reducible hernia. McBurney's operation, May 23, 1890. Not heard from since discharged, September 8, 1890.

20. K. F., aged eleven. Small, right, oblique, inguinal, reducible hernia. McBurney's operation, August 4, 1890. Last observation, March 27, 1892, the hernia has not recurred.

21. E. W., aged five. Small, left, oblique, inguinal, reducible hernia. McBurney's operation, August 11, 1890. November 11, 1890, the hernia has recurred. Patient wears truss.

22. D. H., aged nine. Small, left, oblique, inguinal, reducible hernia. Operation, August 23, 1890. Healed per primam. Last observation, March 23, 1892, linear scar, result still perfect.

23. T. Y., aged fifty-two. Large, right, oblique, inguinal, irreducible hernia. Operation, September 17, 1890. The adhesions were too firm and too extensive to admit of the reduction of the hernia.

24. J. C. H., aged twenty-seven. Large, left, oblique, inguinal, reducible hernia. Operation, September 24, 1890. Healed per primam. Last observation, November 15, 1892. A few weeks after the patient had left the hospital a small abscess formed about

one of the stitches. Just at this spot there is a distinct impulse on coughing.

25. G. S., aged forty. Large, left, oblique, inguino-scrotal, irreducible hernia. Operation, September 27, 1890. The operation was a difficult one, and consumed two hours. Stitch abscess, March 1, 1892. Patient cannot be found.

26. C. M., aged four. Large, right, inguinal, congenital, reducible hernia. Operation, October 7, 1890. Healed per primam. March 1, 1892, patient cannot be found.

27. M. C., aged twenty. Large, right, oblique, inguino-scrotal, reducible hernia. Operation, November 26, 1890. Healed per primam. The wound had been healed nearly three weeks when an abscess formed about the outermost stitch. This might be accounted for by the fact that the patient had at the time an acute purulent inflammation of the neck. Last observation, June 5, 1892, the hernia is beginning to recur.

28. W. M. S., aged three. Large, right, oblique, inguinal, strangulated hernia. Operation, November 10, 1890. Healed per primam. Last observation, March 25, 1892, firm linear scar, result still perfect.

29. E. L. P., aged seven. Small, right, oblique, inguinal, reducible hernia. Operation, November 21, 1890. Healed per primam, except for a small stitch abscess. Last observation, March 20, 1892, linear scar, perfect result.

30. A. M., aged fifteen. Left, oblique, inguinal, reducible hernia. Operation, November 24, 1890. Healed per primam. Last observation, March 28, 1892, linear scar, perfect result.

31. S. P., aged thirty. Small, right, direct, inguinal, reducible hernia. Operation, January 29, 1891. Healed per primam. Last observation, April 2, 1892, linear scar, perfect result.

32. F. H., aged forty. Small, right, oblique, inguinal, reducible hernia. Operation, January 28, 1890. Healed per primam. Last observation, March 30, 1891, linear scar, perfect result.

33. J. W., aged twenty-eight. Small, right, oblique, inguinal, reducible hernia. Operation, January 23, 1891. Healed per primam. June 1, 1892, cannot be found.

34. F. S., aged twenty-seven. Small, left, oblique, inguinal, reducible hernia. Operation, February 6, 1891. Healed per primam, except for minute stitch abscess. Last observation, March 2, 1891, linear scar.

35. J. L., aged fourteen. Small, left, oblique, inguinal, re-

ducible hernia. Operation, February 20, 1891. Wound suppurated. Last observation, March 1, 1892, hernia has not recurred.

36. J. T., aged forty-seven. Small, right, oblique, inguinal, reducible hernia. Operation, February 24, 1891. Healed per primam. Last observation, November 15, 1892, linear scar, perfect result.

37. P. J., aged six. Small, left, oblique, inguinal, reducible hernia. Operation, March 17, 1891. Healed per primam. Last observation, April 14, 1891, result still perfect.

38. E. K., aged twenty-seven. Small, left, direct, inguinal, reducible hernia. Operation, March 13, 1891, open wound. Last observation, March 21, 1892, the hernia has not recurred.

39. E. J. C., aged twenty-three. Small, right, oblique, inguinal, irreducible hernia. Operation, June 5, 1891, the wound was opened completely for hæmorrhage. Healed by granulation. April 2, 1892, the hernia has recurred.

40. M. P., aged thirty-five. Left, oblique, inguinal, reducible hernia. Operation, May 8, 1891. Stitch abscess. June 1, 1892, patient cannot be found.

41. F. S., aged fourteen months. Small, right, inguino-scrotal, congenital, reducible hernia. Operation, May 19, 1891. Healed per primam. June 1, 1892, patient cannot be found.

42. J. K., aged four. Right, oblique, inguino-scrotal, reducible hernia. Operation, June 26, 1891. Wound suppurated. Last observation, April 5, 1892, the hernia has not recurred.

43. F. D., aged forty-nine. Small, right, oblique, inguinal, reducible hernia. Operation, June 26, 1891. Stitch abscess. Last observation, April 3, 1892, the hernia has not recurred.

44. P. H., aged five. Left, oblique, inguinal, irreducible hernia. Operation, September 11, 1891. October 2, 1891, stitch abscess. March 1, 1892, patient cannot be found.

45. P. C., aged twenty-eight. Small, right, direct, inguinal, reducible hernia. Operation, July 16, 1891. Wound healed per primam. March 23, 1892, patient cannot be found.

46. W. G. W., aged two and one-half. Small, right, inguino-scrotal, congenital, reducible hernia. Operation, July 25, 1891. Wound healed per primam. Last observation, April 1, 1892, linear scar, perfect result.

47. G. B., aged twenty-two. Right, oblique, inguino-scrotal, reducible hernia. Operation, August 4, 1891. Wound healed per primam. Last observation, July 1, 1892, linear scar, perfect result.

48. A. McL., aged twenty-six. Right, oblique, inguino-scrotal,

strangulated hernia. Operation, September 8, 1891. Wound suppurated. Last observation, March 1, 1892, hernia has not recurred.

49. M. W., aged eleven. Right, inguino-scrotal, congenital, reducible hernia. Operation, August 7, 1891. Wound healed per primam. Last observation, November 1, 1891, the hernia has not recurred.

50. G. B., aged three. Small, right, oblique, inguinal, reducible hernia. Operation, September 30, 1891. Wound healed per primam. Ultimate result unknown.

51. J. W. B., aged five. Small, left, oblique, inguinal, reducible hernia. Operation, October 9, 1891. Stitch abscess. Last observation, March 3, 1892, the hernia has not recurred.

52. H. P., aged twenty-nine. Small, right, oblique, inguinal, irreducible hernia. Operation, October 9, 1891. Wound suppurated. Healed by granulation. Last observation, March 20, 1892, the scar has stretched throughout its entire length. Truss advised.

53. E. L. B., aged twenty-eight. Small, right, oblique, inguinal, reducible hernia. Operation, December 3, 1891. Wound healed per primam. Last observation, April 7, 1892, linear scar, perfect result.

54. A. M., aged four. Small, right, oblique, inguinal, strangulated hernia. Operation, November 25, 1891. Stitch abscess. Last observation, April 6, 1892, the hernia has not recurred.

55. H. B., aged twenty-one. Small, left, oblique, inguinal, reducible hernia. Operation, December 10, 1891. Stitch abscess. June 1, 1892, patient cannot be found.

56. H. R., aged twenty. Small, right, oblique, inguinal, irreducible hernia. Patient's hernia has been once unsuccessfully operated upon by another surgeon. Operation, December 8, 1892. Wound healed per primam. Last observation, December 3, 1893, linear scar, perfect result.

57. H. H., aged two. Small, right, oblique, inguinal, reducible hernia. Operation, February 12, 1892. Wound healed per primam. March 1, 1892, patient cannot be found.

58. A. F., aged 30. Very large, left, oblique, inguino-scrotal, reducible hernia. Operation, February 23, 1892. Wound healed per primam. March 1, 1892, patient cannot be found.

59. K. H., aged thirty. Large, left, oblique, inguino-scrotal, reducible hernia. Operation, March 4, 1892. Wound healed per primam. A drop or two of pus about one stitch. March 1, 1893, patient cannot be found.

60. C. S., aged twenty-eight. Small, right, oblique, inguinal, irreducible hernia. Operation, March 11, 1892. The wound healed per primam. June 1, 1892, patient cannot be found.

61. J. S. L., aged forty-seven. Large, left, oblique, inguino-scrotal, reducible hernia. Operation, April 22, 1892. Stitch abscess. March 1, 1892, patient cannot be found.

62. J. F., aged thirty-eight. Very large, right, oblique, inguino-scrotal, strangulated hernia. Operation, May 12, 1892. The wound healed per primam. Patient had parotid abscess on both sides. Last observation, June 22, 1892, linear scar.

63. C. C., aged sixteen. Small, left, oblique, inguinal, reducible hernia. Operation, May 27, 1892. The wound healed per primam. Last observation, June 27, 1892, linear scar.

64. M. W., aged forty-five. Large, left, oblique, inguinal, strangulated hernia. Operation, May 22, 1892. Wound healed per primam. Last observation, September 1, 1892, linear scar; the hernia has not recurred.

65. T. M., aged thirty-three. Very large, direct, inguino-scrotal, traumatic, strangulated hernia. Operation, May 24, 1892. A gangrenous appendix vermiformis was excised. The wound suppurated. The patient was discharged, July 2, 1892, and cannot now be found.

66. T. McC., aged nine. Small, left, oblique, inguinal, congenital, irreducible hernia. Operation, May 27, 1892. The wound healed per primam. Last observation, June 23, 1892, linear scar.

67. F. C., aged twenty-three. Right, oblique, inguinal, reducible hernia. Operation, June 9, 1892. The wound suppurated. Discharged July 4, 1892.

68. J. McN., aged thirty-four. Large, right, oblique, inguino-scrotal, irreducible hernia. Operation, June 10, 1892. The wound healed per primam. Discharged for insolence, June 25, 1892. Last observation, February 20, 1893, linear scar, perfect result.

69. G. B., aged three. Small, left, oblique, inguinal, reducible hernia. Operation, June 15, 1892. The wound healed per primam except for a minute stitch abscess.

70. J. N. W., aged twenty-one. Small, left, oblique, inguinal, reducible hernia. Operation, June 16, 1892. Wound healed per primam. Last observation, September 1, 1892, linear scar, perfect result.

71. C. S., aged fifty-eight. Small, right, oblique, inguinal, reducible hernia. Operation, June 23, 1892. The wound healed per primam. Discharged July 23, 1892.

72. M. W., aged forty-five. Small, right, oblique, inguinal, reducible hernia. Operation, July 5, 1892. The wound healed per primam. Last observation, September 1, 1892, linear scar.

73. H. R., aged twenty-five. Very large, right, oblique, inguino-scrotal, irreducible hernia. Operation, August 9, 1892. The wound healed per primam except for slight suppuration about one stitch. Discharged, September 8, 1892, well.

74. G. S., aged twenty-five. Small, left, oblique, inguinal, reducible hernia. Operation, September 1, 1892. The wound healed per primam. Discharged October 5, 1892, well.

75. A. B., aged twenty-five. Left, oblique, inguinal, strangulated hernia. Operation, October 6, 1892. The wound healed per primam. Discharged, November 1, 1892.

76. W. K. H., aged forty-three. Small, left, oblique, inguinal, reducible hernia. Operation, November 29, 1892. The wound healed per primam. Discharged December 27, 1892.

77. C. C., aged twenty-two. Large, right, oblique, inguino-scrotal, reducible hernia. Operation, December 13, 1892. The wound healed per primam. Discharged January 18, 1893.

78. A. E., aged five. Small, right, oblique, inguinal, reducible hernia. A recurrence after McBurney's operation in four months. Operation, December 5, 1890. The wound healed per primam. Last observation, April 6, 1892, the hernia has not recurred.

79. C. M. S., aged fifty. Large, right, femoral, strangulated hernia. Operation, December 25, 1892. Typical healing.

80. B. D., aged twenty-two. Large, left, oblique, inguinal, reducible hernia. Operation, January 13, 1893. Typical healing.

81. J. G., aged fifty-nine. Very large, right, oblique, inguinal, reducible hernia. Operation, January 10, 1893. The wound healed per primam.

82. M. L., aged two. Large, right, oblique, inguinal, strangulated hernia. Operation, January 29, 1893. Typical healing.

#### CONCLUSIONS.

The time has come when one may operate upon almost every case of hernia not only without danger to the patient, but also with an almost certain prospect of success. Those who, with Bull, have dropped the term "cure" may take it up again. That the mortality is practically nothing one may convince himself from the latest statistics.

Svensson and Erdman had from 106 cases one death from enteritis and nephritis on the tenth day, when the wound was perfectly healed. Macewen operated ninety-eight times for the cure of inguinal hernia from 1889 to 1890. The only fatal case was that of a boy three years old who contracted scarlet fever after the operation and died within thirty-six hours. Bassini has operated two hundred and fifty-one times for non-strangulated hernia by his method, with but one death, and this from pneumonia fifteen days after the operation. The wound in the fatal case had healed per primam. Lucas-Championnière from 111 cases lost one from pneumonia. Kocher reports 119 operations for the radical cure of hernia with one death. The cause of death was pulmonary embolism fifteen days after the operation and when the wound was perfectly healed. We have operated eighty-two times for the radical cure of hernia without a death.

If it is objected that had it not been for the operation none of the deaths above enumerated would have occurred, we cannot positively deny it. But it is not improbable, as Kocher cleverly remarks, that if one should keep under observation hundreds of hernia cases of all ages and classes, and present them every day with a good dinner, he would occasionally be able to announce a death among them. As to the ultimate results, I shall refer only to those of Macewen, Bassini and myself. Macewen failed but once in 98 cases, and has had several cases under observation for ten years or longer. Bassini failed but seven times in 251 cases; 108 cases had been cured from one to four and one-half years, 33 from one year to six months, and 98 from six months to one month. In only four cases was the result unknown. It is now nearly four years that I have been operating for the cure of inguinal hernia in the manner just described by me, and thus far I have no failure to record, if we exclude the recurrences which I have reported, and which could not be ascribed to my method.



# A SYLLABUS OF INTESTINAL SURGERY.

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## INTRODUCTION.

GOOD results in intestinal surgery, like all other products of industry, depend on systematic experiments, systematic observation and reasoning. Progress in any direction depends on experiment, and the nineteenth century is characterized by experimental research beyond all past ages. Even the people now await the successful experiment of any issue. What are the results after trial? is the watchword of to-day. The intense interest and even rivalry in intestinal surgery, together with its constant agitation, is sufficient evidence that its present condition is unsettled. The gynæcologist deals with the intestines at every abdominal section, and half the battle of laparotomy is with the intestines. The specialist will always concern himself with the viscera which are of immediate interest to his operation. Above all physicians the gynæcologist should be the intestinal surgeon.

The great questions yet to solve in intestinal surgery are:

- (1) Which are the best means to coapt surfaces to heal?
- (2) What means will produce a cicatrix that will contract the least?

The dangers of intestinal surgery are both *immediate* and *remote*. My friend, Dr. Connell, of Milwaukee, who originally suggested the bone plates, has placed on record a new operation for circular enterorrhaphy. I tried a similar operation previously, but it did not give good results in my hands.

Intestinal surgery must continue to progress to attain any

satisfactory degree of perfection. Since 1890 I have invented and used three kinds of plates for intestinal anastomosis. The first was the cartilage plate (Dr. Stamm also simultaneously invented and used this kind of plate). The second plate I used was the raw-hide plate, which did good work. The third plate I offered and used much was the segmental rubber plate. I think this plate is yet very valuable, and will do good service in anastomosis. I now have a fourth plate to offer the profession for intestinal anastomosis. It consists of a metal disc which firmly holds together two raw-hide plates. The plate has no sutures, and the metal disc is made sufficiently small to readily pass through the ileo-cæcal valve without causing obstruction. The raw-hide plates will digest, and hence not interfere with fecal currents. In the invention of this plate I have attempted to avoid the fecal fistula on the lateral aspects of the plates. Also, the plates can be used rapidly. Such raw-hide anastomotic plates can be made of any desired size. In using them for anastomosing the gall bladder to the intestines, the raw-hide plate on the side of the intestine can be made much larger, so that the metal disc will not drop into the gall bladder, but into the intestine. Further work in this plate may enable me to construct a plate which will fall into several pieces after it has accomplished its work. Also, the metal disc may yet be made of absorbable or digestible material. In working with these plates, Dr. Joseph B. Bacon, of Chicago, has rendered assistance and valuable suggestions, especially in the application of the plates to rectal strictures, to which Dr. Bacon has devoted much labor.

A new device in the form of a metal "anastomosis button" has been given to the profession by my friend Dr. J. B. Murphy, of Chicago. The device is simply a plan which works on the principle of a collar button. Relative to this "button" I offer the following criticism: The cicatrix will contract as others do; the button, when it has finished its work, is apt to obstruct the ileo-cæcal valve. I suggested to Dr. Murphy the idea that I gained while experimenting. This idea was that all anastomotic means should be by material that would hold intact as long as desired, and then break down. I suggested to Dr. Murphy to

build up his "button" with raw-hide, or some digestible material, so that it would break down or fall to pieces after so many days. Also, to make his button of an oval form, so that the anastomotic opening could be made sufficiently large for remote usefulness. So far I have found nothing more suitable, convenient and useful than the segmented rubber plates.

With increasing experience I see many difficulties in securing good results in intestinal surgery on account of the pathological condition demanding operation; on account of the continual function of the digestive canal during repair, and also the still imperfect diagnosis and technique.

With these few remarks, I will offer the following condensed views in regard to intestinal surgery. The following plan will serve for reference and aid in comprehending the relations of the parts to the whole:

#### SYLLABUS.

Intestinal obstruction is relieved by—

1. Injections (air, water).
2. Lavage.
3. Puncture.
4. Massage.
5. Operation.

I found by carefully-conducted experiments that it was not safe to inject water beyond the ileo-cæcal valve, but it is safe to inject air beyond that valve.

The means of treatment which may obscure symptoms are:

- (a) Opium.
- (b) Injections of water and lavage.

*Diagnosis.*—The digestive tract has four primary weak points: Two physiological (pylorus and ileo-cæcal valve); one mechanical anus; a sigmoid flexure; and two secondary weak points: Hepatic flexure; splenic flexure.

*Aids to Diagnosis.*—History of (a) peritonitis; (b) strangulated hernia; (c) mesenteric gland disease.

## CLASSIFICATION OF INTESTINAL OBSTRUCTION.

- I. (*a*) Congenital; (*b*) acquired.
- II. *Mechanical*:
  - (*a*) Pressure from without.
  - (*b*) Change of gut line.
  - (*c*) Bowel lumen blocked.
- III. *Clinical*:
  - (*a*) Acute.
  - (*b*) Chronic.
- IV. *Pathological Anatomy*:
  - (*a*) Strangulation by bands.
  - (*b*) Invagination.
  - (*c*) Volvulus.
  - (*d*) Stricture.
  - (*e*) Foreign bodies.
  - (*f*) Neoplasm.
  - (*g*) Fæcal mass.
  - (*h*) Tumors.
  - (*i*) Local and general paralysis.
  - (*j*) Flexions.
  - (*k*) Changes in peritonæum.

## I. STRANGULATION BY BANDS AND THROUGH APERTURES.

1. It constitutes one-third of intestinal obstruction, or  $\frac{13}{40}$ .
2. Seventy per cent. have had peritonitis.
3. Shrinking of mesentery.
4. Mesenteric holes (natural or artificial).
5. Meckel's diverticulum and vermiform appendix.
6. Cure by operation.
7. It is rapidly fatal, average eight days.
8. Danger of gangrene.
9. The profound disturbance is due to excessive peristalsis aroused by irritation of periphery of sympathetic at seat of obstruction.
10. The gut may tie a knot.
11. Strangulation over or under a band.

12. Strangulation by stretching.
13. Strangulation by kinking.
14. The part of gut strangulated is nearly always the small gut (especially lower ileum with elongated mesentery).
15. The gangrene is due to obstruction of venous blood.
16. More males than females suffer from bands (males three, females two).
17. Men have appendicitis and hernia, while women have pelvic peritonitis; but bands are about equal in each (woman's appendicitis is diagnosed as pelvic peritonitis).
18. Age of bands is from twenty to forty, or the age of peritonitis.
19. Attack is sudden and obstruction is partial or complete. The complete obstruction gives constant pain, and partial obstruction gives intermittent pain. This matter I observed in many experiments.
20. Pain is a characteristic feature from first to last (gangrene may lessen it).
21. Vomiting is conspicuous, and constipation usually complete (spurious stools may occur).
22. Temperature generally low (sub-normal) from shock and insufficient oxidation of blood.
23. If vomiting is frequent thirst is intense.
24. Distension is moderate, not as much as in volvulus.
25. Distension depends on paralysis of bowel wall, and colic is a sign that the walls are not paralyzed.
26. Pain is not reliable as a clue to the seat of the obstruction, for nearly always the pain is referred to the solar plexus, or the belly brain.
27. A local swelling may be detected, local dulness may be found, and the rectum may reveal something, but diagnosis is very uncertain.
28. Extensive local adhesions (matting) may compress the bowel so as to occlude its lumen.
29. The nipping of the bowel circumference may obstruct the fecal current by arresting peristalsis.
30. A diverticulum may cause obstruction by adhesions.

## II. INVAGINATION.

1. Invagination is the projection of a segment of bowel into that immediately adjacent to it.
2. It constitutes one-third of intestinal obstruction, or  $\frac{1}{3}$ .
3. Seventy per cent. occurs at ileo-cæcal valve.
4. Fifteen per cent. occurs in large gut.
5. Fifteen per cent. occurs in small gut.
6. Twenty-five per cent. occurs in children under one year.
7. Fifty per cent. occurs in children under ten years.
8. It is a disease of childhood.
9. The cause is irregular muscular action of the gut wall.
10. We have "invagination of death," non-inflammatory, of no importance.
11. Inflammatory invagination is the important one.
12. Invagination of death occurs in patients who die of brain disease.
13. Names of parts: Intussusciens (receiving layer).  
Intussusceptum (entering and returning layer).  
The apex is at the lower end of the intussusceptum.  
The neck is at the upper end of the returning layer.
14. The points of danger are gangrene; (*a*) at apex; (*b*) at neck; (*c*) at centre of returning layer (by œdema).
15. The check to invagination is the mesentery, but that will elongate.
16. Blood occurs in 80 per cent. of these cases in stools.
17. Pain is at first periodical, because the obstruction is partial; but pain is a distinct feature. It made the dogs very sick until relieved by gangrene, disinvagination or operation.
18. Spontaneous disinvagination almost always occurs in dogs when the gut is not sutured in position.
19. Cure by disinvagination or anastomose gut above to gut below by plates.
20. It becomes irreducible by (*a*) œdema of returning layer; (*b*) inflammatory adhesions.
21. The œdematous variety can be reduced by squeezing out the fluids with the hands first.

22. The remote causes are diarrhoea, dysentery, enteritis, polypi, stricture, bowel contents, acute and chronic bowel disease.

23. Symptoms: Blood in stools, sudden onset, pain, vomiting, shock, tenesmus, and may be tumor.

24. It is very fatal, and recovered patients often die of stricture (40 per cent).

25. Spontaneous cure by disinvagination or sloughing of the neck and intussusceptum.

26. In invagination the cranial brain loses control over the abdominal brain, and the belly brain is then incapable of sustaining regular rhythm of the viscera and the muscles of the gut wall run riot. Irregular local muscular action in the gut wall arises, followed by invagination.

27. Resection is very dangerous, as well as circular enterorrhaphy, and artificial anus should be avoided.

28. In closing the proximal and distal ends of the bowel, only one-fourth inch should be invaginated, as invagination subsequent to operation may occur. (It killed some of my dogs, about 4 per cent).

29. The periodical exacerbation of pain should be noted in invagination, while constant pain exists in complete obstruction. Invagination seldom makes complete obstruction. Vomiting is not so severe as in complete occlusion. Invagination is seldom or never the cause of complete obstruction, so that the stools will often be liquid and bloody on account of an exalted peristalsis and secretion of bowel, with rupture of capillaries at seat of invagination. The dogs had very severe tenesmus, and this is the report of human cases. The whole system is affected, and the patient soon wears out from pain and suffering. Distension is rare. The pain is referred to the solar plexus.

I saw a specimen of ileo-cæcal invagination from a ten-months child, which killed it in thirty-six hours. In 220 cases, 150 were ileo-cæcal, and of these 150 cases about one-half showed a tumor at rectum. Many times this rectal tumor or ileo-cæcal valve has been amputated for a rectal polypus. The valve is the guide. Treves states that the general mortality of

invagination is 70 per cent. The acute cases die in about a week. Spontaneous elimination occurs in some 40 per cent. of cases, and from an inch to several feet of gut will pass per rectum. But over 40 per cent. of patients who have had spontaneous cure of invagination by elimination die from its effects. Death results mainly from stricture. Statistics show that of 100 persons who have had invagination, 80 per cent. die from primary and secondary causes; 20 per cent. get well out of the 100. The danger in spontaneous elimination of invaginations is at the neck of the invagination, from gangrene and peritonitis. The final cause of death is likely cerebral anæmia.

### III. VOLVULUS.

1. It constitutes two-fortieths of all intestinal obstruction.
2. Sixty per cent. occurs in the sigmoid.
3. Thirty per cent. occurs in the cæcum.
4. Ten per cent. occurs in the small gut.
5. The cause is (*a*) elongated mesentery; (*b*) fatless mesentery; (*c*) obstruction to fæces; (*d*) history of constipation.
6. It is rapidly fatal (in about six days).
7. Cure by operation. If one cannot untwist it perform anastomosis of gut above to gut below. For when the peristalsis caused by the volvulus is checked by turning the faecal current, the danger of gangrene will be checked, and the volvulus will untwist itself.
8. I could not make a permanent volvulus in a dog, as it untwisted itself.
9. The danger is due to gangrene, *i. e.*, obstruction to return of venous blood. The artery flows long after the vein is occluded by pressure, and thus causes œdema.
10. Distension is a marked feature. Constipation plays a rôle in elongating the mesentery.
11. Occurs between forty and sixty years of age.
12. Males have it about four times as often as females.
13. Pain is a natural feature of the case.
14. Vomiting very often arises.
15. Shock is apt to occur.
16. Temperature may be sub-normal.



## IV. GALL STONE.

1. It constitutes two-fortieths of all intestinal obstructions.
2. It lodges in duodenum, 30 per cent.
3. It lodges in lower ileum, 50 per cent.
4. It lodges in other locations, 20 per cent.
5. Large gall stones ulcerate through gall bladder into intestines.
6. One or more may form a nucleus for an enterolith, or foreign body.
7. I have often noted that a big stone will give no trouble to a patient, as it cannot go down the duct nor obstruct it.
8. Gall stones must be diagnosed from pylorus, head of pancreas, super-renal capsule, kidney, gall bladder, and ovarian tumor. (A silver dollar will touch the six points.)
9. A gall bladder has an anchorage which will turn on its axis as a radius, and go left to right.
10. The majority of gall stones pass without difficulty.
11. The obstruction is similar to other obstructions.

## V. STRICTURE.

1. Sixty per cent. occurs in sigmoid.
2. Ten per cent. occurs in descending colon.
3. It frequently arises in cancer, dysentery, and diarrhœa.
4. It is due to loss of substance and cicatricial contraction of gut wall. Hence we have cicatricial and cancerous bowel strictures.
5. Inflammatory.
6. Hypertrophic.
7. Valvular.
8. Polypus.
9. A growth in the bowel wall.
10. It is apt to occur at the hepatic or splenic flexure.
11. Stricture is a complete or partial narrowing of the gut lumen. The stricture must attack one of the two bowel coats, viz.: muscular or mucous coat. The serous coat is excluded in the pathology of intestinal stricture. Leube divides strictures, 1, typhoid; 2, dysenteric; 3, catarrhal; 4, pelvic; 5, syphilitic;

6, tubercular. Literature shows that dysentery causes frequent strictures, especially in the sigmoid, in the hepatic and splenic flexures, descending colon and rectum. Tubercular ulcers producing stricture will be located where there are lymphatic glands, *e. g.*, in the small intestines, but if they occur in the large bowel it is generally in four weak points of the colon, viz.: (*a*) sigmoid flexure; (*b*) hepatic flexure; (*c*) splenic flexure; (*d*) the descending colon. Fifty per cent. of stricture from tuberculosis occurs in the sigmoid. Strictures resulting from tuberculosis may be multiple. I would add to Leube's division stricture from injury and from strangulated hernia; also from bands long in contact with bowel and slipped through aperture. Stricture occurs almost entirely in adults.

#### VI. NEOPLASMS.

1. Adenoma.
2. Fibro-myoma.
3. Angioma.
4. Sarcoma.
5. Carcinoma.
6. Polypus.

#### VII. FOREIGN BODY.

1. Enterolith (ovenolith).
2. Bodies introduced from without.
3. Worms.
4. Biliary and intestinal calculi.
5. Hard feces.
6. Dislocated polypus.

#### VIII. FÆCAL MASS.

1. Cerebral paralysis.
2. Local paralysis.
3. Paralysis of solar plexus or periphery of sympathetic.
4. Reflex irritation.

#### IX. TUMORS.

1. Abdominal.

2. Pelvic.
3. From abdominal and pelvic wall.
4. Polypus.
5. Outside gut wall.
6. In gut lumen.
7. In wall itself.

The obstruction is located in the gut wall, outside the gut wall, or in the gut lumen.

#### X. LOCAL PARALYSIS. (Ileus Paralyticus.)

1. Peritonitis: local, chronic, acute, general.
2. Trauma.
3. One and one-half per cent. of laparotomies die from intestinal obstruction.
4. In this form a segment of gut is paralyzed and dilates holding gas, but will not allow feces to pass, from loss of peristalsis.
5. Cathartics ( $Mg\ SO_4$ ) stimulate it into action, and dehydrate the blood.
6. Littre's hernia (nipping bowel circumference) destroys intestinal peristalsis.

The operator must decide what kind of operation he will do after the abdomen is opened.

7. It mostly occurs in adult females.
8. It is frequent among insane.
9. It is common in hysteria.
10. Occasionally a tunnel through the fecal mass serves for an anus.
11. Sometimes the bowel is relieved from the mass by a catarrh of the mucous membrane, causing the bowel to secrete fluids which dissolves the fecal mass. It is often caused by assisting the daily rhythm of the solar plexus by defecating regularly. The rhythm of the various ganglionic centres situated in the viscera will not tolerate tampering with; a little disturbance destroys their rhythm forever. The ganglia of the bowels are Meissner's and Auerbach's. Rhythm must go regular, or it becomes deranged.

Insufficiency of forces which drive the bowel contents toward the rectum, stercoral ulcers from gangrene of mucous membrane, due to pressure and irritation of fecal mass, may lead to perforation of gut wall. Ileus paralyticus may affect both large and small intestines, but it is the most common in the large bowel.

Renauldin reports sixty pounds of feces found in a patient at death, who suffered from ileus paralyticus.

The causes of ileus paralyticus are: 1, a small and feeble abdominal brain; 2, deranged cerebro-spinal axis; 3, injury to Auerbach's and Meissner's plexus; 4, infection of peritonæum, local and general; 5, sedentary life; 6, heredity; 7, condition of feces, as bile or no bile, etc.; 8, condition of blood; 9, condition of whole nervous system; 10, condition of bowel itself, as congenital or acquired diseases.

#### XI. FLEXION.

1. Kink in bowel. It may be under a band.
2. Circumference of bowel nipped.
3. In 225 dog operations I never saw a flexion cause obstruction.
4. Any kind of flexion that checks peristalsis will cause obstruction.

#### XII. CHANGE IN PERITONÆUM.

1. Shrinking of mesentery.
2. Mesenteric gland disease.

#### OPERATION.

The general symptoms before operation:

1. Pain; 2, vomiting; 3, constipation.

The general symptoms after operation:

1. Distension; 2, vomiting; 3, peritonitis.

Kinds of intestinal operations:

- 1, Artificial anus; 2, enterectomy; 3, anastomosis; 4, circular enterorrhaphy; 5, Jobert's operation; 6, author's operation; 7, gastro-entérostomy; 8, resection; 9, colostomy; 10, ilio-colostomy; 11, implantation; 12, simply to destroy bands and break adhesions.

The landmarks in opening the abdomen for intestinal obstructions are :

1. First find the cæcum or the sigmoid.
2. Most intestinal obstructions lie below the umbilicus in right or left iliac region.
3. The empty guts lie in pelvis, and the distended lie higher in abdomen.
4. The length or direction of the mesentery is not reliable ; the cæcum and sigmoid may be anywhere in the abdomen or pelvis.
5. Gas or air introduced per rectum aids.
6. The large gut has three longitudinal bands and appendicæ epiploicæ.
7. The landmarks are the cæcum, sigmoid and duodenum.
8. Intra-abdominal use of the hand is insufficient in intestinal surgery. The operator must not only feel with his hands but must see with his eyes.
9. Seize no coil to operate on which is not distinctly known.
10. If the operator requires the direction of the gut to be known, find it from the cæcum, and then tie different colored ribbons as upper and lower marks of gut, then replace all bowel in abdominal cavity except that required for operative use.
11. Pay full respect to the great omentum, and be sure to respread it after operation. Close omental holes.
12. The abdomen should be opened in the median line, as it heals and prevents hernia.

#### HERNIA.

1. Inguinal.
2. Femoral.
3. Obturator.
4. In great sciatic foramen.
5. Through Petit's triangle.
6. Diaphragmatic.
7. Retro-peritoneal through the fossa duodeno-jejunalis.

#### AIDS TO INTESTINAL SURGERY.

1. Decalcified perforated bone plates (Senn and Connell).

2. Segmented rubber ring (Brokaw).
3. Catgut ring (Abbe).
4. Raw-hide plate (Robinson).
5. Cartilage plate (Robinson and Stamm).
6. Segmented rubber plate (Robinson).
7. Catgut mats (Davis).
8. Rubber ring (Senn).
9. Rubber tube (Robinson).
10. Solid catgut ring for circular enterorrhaphy (Matas).
11. Solid catgut rod for linear enterorrhaphy (Brokaw).
12. Chromicized gelatine plates (Shrively and Simonson).
13. Potato plate (Dawbarn).
14. Grafts and scarifications.
15. Collar button (Murphy).
16. Raw-hide button (Robinson).

#### DANGERS IN INTESTINAL SURGERY.

1. Faecal fistula.
2. Gangrene.
3. Paralysis of gut.
4. Peritonitis.
5. Invagination subsequent to operation (Robinson).
6. Stricture at seat of operation (progressive).
7. Evisceration (shock).
8. Catgut infection.
9. Too many ligatures drawn too tight.
10. Operation on mesenteric side of bowel.
11. Bowel resection (shock).
12. Invagination sutures in Jobert's operation.
13. Excessive manipulation of viscera (shock).
14. Prolonged operation (shock).
15. Infection from without through pathological gut wall.
16. Pathological adhesions (over 200 dog post-mortems show that adhesions follow 80 per cent. of operations).
17. Shock depends on the damage inflicted on the abdominal brain and the number of square inches of peritonæum which have been subject to trauma. I found that low temperature gave profound shock, endangering recovery.

18. Anastomosis with only sutures or rings (fistula, gangrene).

19. I have proved many times that a bimucous fistula will close from one-quarter to three-quarters its original size in a few months if the excluded bowel is partially permeable. I found some of my specimens closed from one and one-half inches to one-quarter inch in diameter in a couple of months. Hence we must make long bimucous fistulae with long oval plates.

20. The danger in anastomosis is fecal fistula at the sides of the coapted plates. I now always use six sutures on the segmented rubber plate, two sutures being on each side. The six sutures should penetrate the gut wall.

21. Too *absorbable* anastomotic "aids," *e. g.*, potato plates, gelatine plates, cartilage plates and, occasionally, decalcified bone plates. Many autopsies proved positively that an anastomotic plate should remain intact for four to six days. I lost dogs by too rapid absorption of cartilage plates, and therefore abandoned cartilage plates, and now use entirely segmented rubber plates. The ring for the plate is made of sheep (chamois) skin strands, and the sutures are cotton.

22. The real danger in obstruction is the irritation of the nerve at the seat of occlusion, and is due to excessive peristalsis, owing to peripheral nerve irritation. It is made worse by decomposition and fermentation (merely cutting off the fecal current does not do the harm).

23. In doing gastroenterostomy now I avoid fecal fistula by suturing the circumference of one wound to the circumference of the other by a stitch passing through the whole gut wall. It avoids immediate leaking.

The sutures of the plates must not be inserted too far from the edge of the gut wound—one-half to two-thirds of an inch is about right in a dog of twenty-five pounds. Catgut is very dangerous, as it swells and enlarges the hole in the gut wall, and appears to act by capillary attraction, enticing infection into the peritoneal cavity. I now use six sutures on every plate, having two at each side, as lateral over-sutures to close in the gut on the side of the plate are dangerous. Beginners ligate the mesentery

too liberally (result, gangrene). Stitches in the mesentery should be short and parallel to bloodvessels. This should be especially observed while making a reef or tuck in the mesentery to shorten it, so as to prevent recurring hernia. Scarification is safer and more effective on the mesentery than on the gut.

Beginners tie the ligatures generally too tight (results, gangrene or the stitches cut through). Ligatures all, or nearly all, fall into bowel lumen; hence a long continuous suture should be avoided, as it might entice infection into the peritonæum, as one end dangles in the gut lumen. An intestinal suture can be usefully continuous for three or six sutures, and then should be interrupted. If grafts are not fixed in position at both ends, peristalsis often rolls them up. If the great omentum is not re-spread over the bowels, the intestines may become adherent the whole length of the abdominal wound. This I have had occur, and it may destroy peristalsis or cause pain. Grafts are more safe to adhere or grow onto bowel if not severed from peritonæum; but when not severed they may form a band or arch, under which a wandering gut may slide to and fro and finally become strangulated. However, I never had a severed graft die. Hernia through abdominal wound occurred several times. To prevent it, one must include in the abdominal suture the peritonæum, the muscles, the (fascial) tendon (resulting from the blending of the external and internal oblique and transversalis muscles), and the skin. The safeguard is the *tendon*. Danger can be avoided by "anchoring" the operated part of the bowel near the abdominal wound so the fecal fistula could be cared for.

#### DANGERS IN CIRCULAR ENTERORRHAPHY.

1. Faecal fistulae.
2. Stricture (circular).
3. Paralysis of segment of gut operated on.
4. Gut is so pathological that it will not heal (from disturbed circulation and nutrition).
5. Difference of bowel lumen.
6. Prolonged operation (shock).
7. Gangrene from numerous sutures.



8. Progressive invaginations subsequent to operation (prevented by rubber tube).

9. *It is dangerous.* Peritonitis immediate and remote (adhesions).

10. The mesenteric side of the bowel is disturbed (in circulation and nutrition).

#### CONTRASTS OF PLATES AND RINGS.

*Ring.* A ring coapts and fixes a small healing surface.

Rings gangrene at joints.

A ring is a deficient splint.

A fistula occurs more frequently with a ring.

Scarification is less efficient with a ring.

Stricture is less liable to follow rings because less cicatricial tissue results.

Graft is same.

*Plate.* A plate coapts and fixes a large healing surface.

Plates give physiological and mechanical rest to a large healing surface.

Plates do not gangrene at this point of suture.

A plate is an ample splint.

A fistula occurs less frequently with a plate.

Scarification is more efficient with a plate (on account of amount of surface coapted).

Stricture is more liable to follow plates because more cicatricial tissue results from inflammation over greater surface.

*Graft* is same (severed or unsevered).

#### DANGER OF INTESTINAL ANASTOMOSIS.

1. Fæcal fistula generally at sides of plate.

2. Subsequent contraction of the bimucous fistula.

3. Progressive invagination of bowel ends, subsequent to anastomotic operation (prevented by sutures). (Robinson.)

4. Too rapid absorption of plates.

5. If graft is unsevered, it might act as a band under which a gut could be strangulated. All mesenteric holes must be closed.

6. Plates too wide will gangrene by pressure.
7. Over-sutures are liable to create fecal fistulae.

#### DIFFICULTY OF DIAGNOSIS OF INTESTINAL OBSTRUCTION.

1. One must differentiate among more than a dozen organs.
2. Mobility and different functions of viscera complicate.
3. Of the four primary weak points in the digestive tract, the caecum may be under the liver or on the pelvic floor. The sigmoid may be in the pelvis or in the abdomen. The pylorus may be displaced downward and to the left. They are movable. The hepatic and splenic flexures are brought out to examine.
4. The abdominal and pelvic viscera vary very much in size even in health.
5. The abdominal walls are variable and distensible, and thus allow great alterations in situation and size of viscera.
6. The viscera do not all hold a distinct relation as regards distance and position to the coeliac plexus or abdominal brain.
7. Though in general the nearer the obstruction is to the coeliac plexus, the more profound the disturbance, it is not always so.
8. The shock may depend upon the amount of peritonaeum damaged or affected with trauma, or the disturbance of the solar plexus.
9. Symptoms in obstruction are variable, according to the patient.
10. Pathological and clinical data have not yet assumed distinct rules or formulae to guide us.
11. I would also note here that the size of the abdominal brain varies very much in subjects which I dissected in both animals and man.
12. Much practical experience is demanded, pathological observation required, and clinical study necessary to detect obstruction. Dogs must be experimented upon, the man's viscera must be dissected with care, and patients repeatedly seen.
13. Mobility of viscera without becoming dislocated.
14. Alteration of viscera without endangering the return to normal condition.

## 15. Obscure history and testimony.

The *prognosis* of intestinal surgery will always be grave, because of the persistent function of the organ to repair. The gut never stops secreting, and it must be repaired while it is doing its usual work. The continuous function of the gut adds to the danger of repair. It is also a very short distance between a cavity which tolerates little infection (peritonæum) to the gut lumen, which contains much infectious material.

The peritonæum, a non-infectious cavity, borders closely on a cavity full of fatal germs. Also much experience is required to know how to repair intestinal lesions. I feel very decided on the idea that it is very unjust to our fellows to learn intestinal surgery on man. By experience I can now save twice as many dogs as previously. At first most dogs died, and I found many died from my errors, which it required a long time to eliminate.

I am quite sorry to see medical men going into courts of justice and assuming to give testimony on intestinal surgery, of which their very testimony shows their ignorance. Intestinal surgery is a very distinct branch, requiring much study, experience and experiments to become proficient in it. The technique is very exacting, and results are not always brilliant; yet its progress the past five years is unparalleled in the history of medicine, but most of the progress came from the experiments on animals. Its future is bright with hope. I wish especially to recognize the names of Treves, Senn, Leichtenstern and others who have aided me by their labors.

# A NEW METHOD OF TREATING NON-MALIGNANT STRICTURES OF THE RECTUM BY TRANS- PLANTATION OF INTESTINE.

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THE literature upon the treatment of rectal strictures is far from encouraging. Careful surgeons never promise the patient a permanent cure with perfect results.

Indeed, the same old story of advising the use of bougies, linear incisions, posterior proctotomy, total extirpation of the cicatricial mass and reuniting the ends of the gut—all have had their enthusiastic supporters for a time, finally to be classed as only occasional or partial cures.

The fact that surgeons do not exhibit their stricture patients before the medical societies, to show their condition after operation, more frequently is good proof that they are not enthusiastic over the result.

Patients who come to the clinics for relief, after having undergone an operation for a cure elsewhere, do not present a condition that is encouraging for the repetition of the surgical procedure by any of the old methods.

Many of them have an incurable incontinence of feces; others present a cicatricial mass that is gradually contracting to produce a stricture worse than the primary one; again, a large fistulous canal is left at the posterior part of the wound. The mortality due to peritonitis or septic infection from the wound, even when the peritoneal cavity was not opened, shows how little modern surgical procedures avail us when operating on the rectum from below.

With this discouraging report from the statistics of other

surgeons to offer patients, it becomes necessary to try and discover some better method.

I have been experimenting upon dogs, with a view of devising a plan to overcome rectal strictures that would enable the surgeon to take advantage of the modern aseptic methods of operating. The brilliant results of abdominal surgeons have demonstrated that laparotomies can be done with a minimum risk. We know that with the Trendelenburg position, the whole of the rectum above the levator ani is accessible for operating, where but few sutures are required. The recent mechanical devices that have

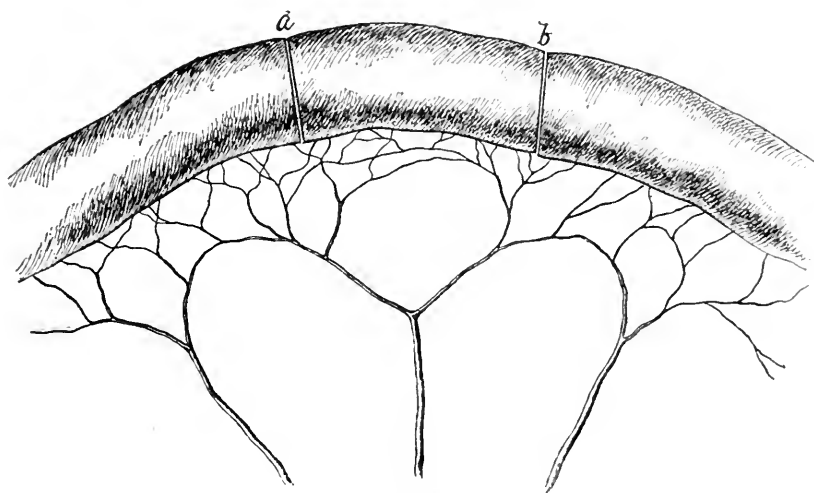


FIG. 1.—How to select a piece of the loop of intestine for transplanting, *a* and *b*.

been invented for intestinal anastomosis, especially the Murphy button, make operations possible that were previously impracticable on account of the time required for suturing, and the danger of fæcal fistulæ and sepsis resulting from the sutures giving way. Experiments upon animals by such thorough investigators as Senn, Robinson and Murphy show that lateral, or end-to-end, anastomosis of the small intestine is practicable, safe, and can be followed by permanent and good results. Robinson demonstrated that a piece of gut, after having been entirely severed from the intestinal tract, although left filled with fæces and its ends invagi-

nated, would live and produce no inconvenience to the dog if the mesentery supplying the severed piece was carefully preserved. He let these dogs live for weeks, and they completely recovered from the operation, gained in flesh, were playful, and showed no unfavorable symptoms from the experiment.

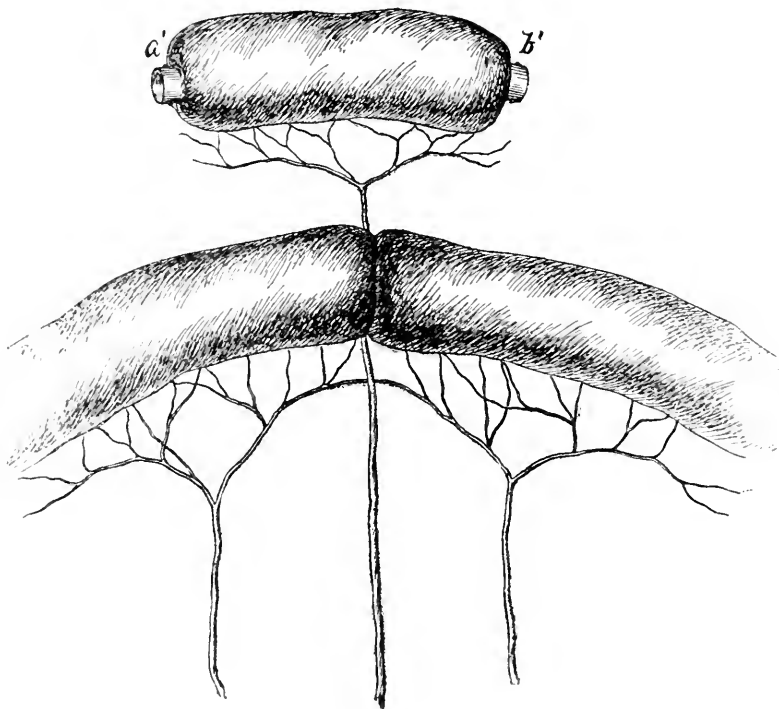


FIG. 2.—Appearance of the piece of gut for transplanting, with the male half of button in each end. End-to-end anastomosis.

Senn anastomosed the ileum into the rectum, and also the colon to the rectum, successfully. He claimed as a result that if a stricture of the sigmoid was to be overcome, his operation would be preferable to an artificial anus, if the opening where the anastomosis was made did not, with time, contract too much.

Murphy demonstrated that by using his button anastomoses of the intestine could be made, either end-to-end or lateral, in a

few minutes. I have confirmed this by experiments many times since his report.

The operation for transplanting intestine consists in completely removing a portion of a loop of small intestine that is lying in proximity to the rectum, and anastomosing each end with the rectum, so as to form a new channel around the stricture. The mesentery of the severed piece of gut is left intact. A piece of intestine is selected from the loop at a point where the mesenteric bloodvessels supply a large nutrient artery for each end of the piece to be transplanted. It is necessary to remember, in cutting out a piece for transplanting, that it must be long enough to extend from a point below the stricture to a point

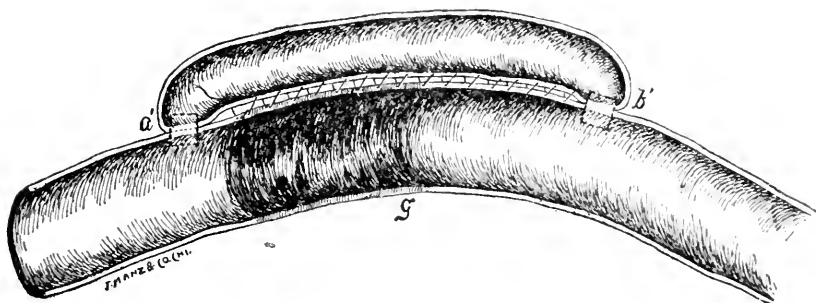


FIG. 3.—Transplanted piece in position, with anastomosis above and below the stricture, *g*. (Threads should not look as if perforating the gut wall.)

above the stricture, where the rectal wall is not too much thinned by ulceration, and also to remember that the button to be inserted into each end will shorten the piece about one and one-half inches.

The operation is completed by scarifying the approximated surfaces of the rectum and transplanted piece of gut, and suturing them together, so as to have the two walls cemented into one firm septum. At a subsequent operation this septum is removed by compression forceps, and the lumen of the rectum and transplanted piece is made into one cavity; and the sloughing out of the compression forceps will destroy one-half of the stricture, together with the septum, thus putting an end to the contraction

of the cicatricial tissue forming the stricture. The mesentery of the transplanted piece is sutured in close approximation to the parietal wall, to prevent the possibility of a loop of intestine sliding under it and becoming strangulated. The Murphy button is now used to make end-to-end anastomosis of the gut from which the transplanted piece was resected, and its mesentery sutured carefully so as to leave no opening for hernia to occur.

Through the kindness of Prof. Tanquary, I was permitted to examine the viscera of fifteen bodies in the dissecting room of the College of Physicians and Surgeons, of this city. In all but

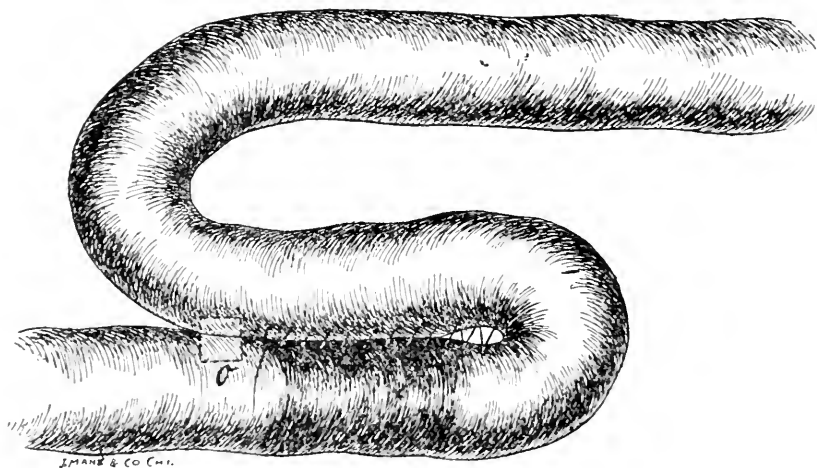


FIG. 4.—Anastomosing of sigmoid and rectum below the stricture, and suturing the surfaces to form a septum.

one of them I was enabled to pull down the sigmoid to the bottom of the Douglass *cul-de-sac* or recto-vesical pouch. This demonstrated to me the possibility of using a modified transplantation operation in many cases, viz.: pull the sigmoid down below the stricture in the rectum, and with a Murphy button anastomose it with the rectum. Scarify the approximated surfaces of the sigmoid and rectum, and suture them together to get a firmly united septum, as in the complete transplanting operation. Subsequently, a part or the whole of this septum is removed by



compression forceps. Thus one-half of the stricture is destroyed and the lumen of the rectum increased.

The female half of the button to be used below the stricture must be inserted by an assistant into the rectum through the anus. By this means the operator can, by feeling deep down in the pelvis from above, instruct the assistant just where to press the staff of the button against the rectal wall, and the incision made directly over the end of the staff will need to be so small that the staff will snugly fill the opening, and thus no sutures will be required for this half of the button. This is a very important point, as suturing in this deep part of the pelvis would be all but impossible. By this means of introducing the lower button, the possibility of faecal infection while placing the button is prevented.

The advantages for transplanting intestine for the cure of rectal strictures are:

- (1) It is more conservative than excising the stricture by the old methods.

- (2) There cannot be a resulting incontinence of faeces.

- (3) It enables one to open the peritoneal cavity by a clean, aseptic operation, without the danger of faecal infection and giving way of dangerous sutures.

- (4) No other method insures a permanent cure, even if the patient survives the operation.

# TRANSACTIONS OF THE NEW YORK SURGICAL SOCIETY.

*Stated Meeting, March 8, 1893.*

The President, ARPAD G. GERSTER, in the Chair.

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## SPLENECTOMY FOR DISPLACED HYPERTROPHIED SPLEEN—RECOVERY.

Dr. F. H. MARKOE presented a patient upon whom he had operated for this condition, together with the specimen. The history was as follows:

Eliza W. L., aged sixty-four, a monthly nurse of good health and inheritance, had borne seven children, suffered two miscarriages, and reached the menopause twenty years ago.

In September, 1888, when worn out by nursing, she attempted to lift a sick child from a crib which had fixed and somewhat high sides. The effort strained her severely, the pain being located low down on the right side of the abdomen. On placing her hand over the spot she felt a protrusion, which she pushed back with great relief. On the following morning, just after arising, she suffered an attack of severe faintness, with nausea and nervous trembling. She had occasionally fainted before. From this time any lifting, hard work or unusual position displaced the lump and caused discomfort. She found, too, that she could not stoop as formerly. Her general health remained about the same until the early part of 1889, when, after a severe and prolonged attack of "Grippe," her digestion became and remained impaired. During the summer of 1890 she fell headlong down a flight of stairs, sustaining severe general contusions. She dates an increase in the size of the lump, with additional discomfort, from this time. Soon after she began to be annoyed by increased frequency of micturition, due to an inability to control the bladder after a certain amount of urine had accumulated. This was most marked when at work, standing or after walking. About the same

time a feeling of pressure in the rectum was experienced, which, when she was constipated, occasioned considerable distress. Her digestive disturbances also grew more marked, and she was much troubled by gaseous distention, with eructations. The slightest indiscretion in amount or quality of food compelled her to remain quiet in a semi-reclining position for one or two hours and to loosen her clothes. Frequent attacks of "sick headache" occurred. Early in 1891 she was suddenly attacked with a severe colic, lasting over an hour, accompanied by marked bearing-down pains, resembling those of childbirth. There was no vomiting and no vaginal discharge. About this time she was examined by Dr. Paul F. Mundé, who pronounced the tumor splenic, and discouraged operative measures unless symptoms compelled it.

In August, 1889, she suffered an attack of facial erysipelas, which recurred about every three months thereafter, always beginning about the right angle of the lower jaw. The speaker saw her for the first time in April, 1892, and made a thorough bimannual examination. The uterus was atrophic and not connected with the growth. The growth itself filled the false pelvis and extended some distance above the umbilicus; was firm and insensitive to touch, with clearly-defined borders. It could be moved from side to side, but not dislodged. Her general condition was poor. She was then anæmic and nervous, and he advised delay until she improved in health, and in order that he might have an opportunity of determining whether the increasing size of the mass and concomitant local and general symptoms warranted surgical interference. Her diet and digestion were regulated, and she was put upon iron and hot baths. Special directions as to the daily care of her face were given, in order, if possible, to prevent further erysipelatous manifestations. At the end of the three months her general condition had greatly improved and no outbreak of erysipelas occurred. The local disturbances were, however, more marked, and the growth had considerably increased in size. The control of the urine was now almost completely lost, and unless the bladder was immediately emptied when the desire was felt the urine flowed away involuntarily. All clothing distressed her, and there was palpitation, with shortness of breath, on exertion. Her life was truly a burden, and she was ready and anxious to have anything done which promised a prospect of relief.

On August 8, 1892, he sent her into his service at St. Luke's Hospital, where careful questioning and physical examination revealed

no evidence of malaria or leukæmia, and proved the lungs, heart and kidneys to be in normal condition. Sterilization of the abdominal parietes was immediately begun and continued until the operation, on August 10, 1892.

One hour before the operation  $\frac{1}{100}$  gr. of atropia had been administered subcutaneously, and a stimulating enema given. Under ether narcosis a median incision was made below the umbilicus, and the tumor immediately recognized as the spleen. The incision was then prolonged above the umbilicus, and after considerable difficulty the enlarged organ was dislodged from the pelvis and lifted into the wound. The inferior extremity lay tightly wedged in the pelvis, the external surface looking anteriorly and slightly inferiorly, while the hilum, or internal surface, was posterior and somewhat superior. The stomach had been dragged down with it, and gastro-splenic and suspensory ligaments stretched into one broad and thin pedicle, in which several accessory spleniculæ were seen, in addition to the large and tortuous vessels. The greatest care had been exercised by his colleague, Dr. B. F. Curtis, in preventing undue tension on the pedicle, as in several reported instances alarming shock and collapse had been observed from this cause. The splenic artery was isolated, and, after being encircled by a stout silk ligature in an aneurism needle, tied. The pedicle was then doubly transfixed and tied with three locked ligatures, the inferior one being tightened first. The portion included in this ligature was then cut away from the spleen, but immediately retracted, throwing off its ligature, and occasioning a momentary sharp venous hæmorrhage. As the operator, however, had held the proximal portion between his fingers while cutting, he was able to quickly and efficiently apply a large clamp.

In order to diminish the strain upon the pedicle he had seized the remaining portion with two similar clamps on the distal side of the ligatures before mentioned, and cut away the spleen. The two remaining ligatures were then tightened, the clamps being slowly removed during the process. In order to guard still further against slipping, he had again transfixed the centre of the pedicle, and included the whole in a ligature of strong silk. One accessory spleen, the size of a pigeon's egg, was tied off in the same manner and removed, several smaller ones being left behind. The retraction of the pedicle had been remarkable, that which before had lain low in the pelvis now lying above the level of the umbilicus. A few clots were wiped away with sponges, the abdomen closed with tier sutures,

and a sterilized dressing applied, no irrigation or drainage being employed. The operation lasted one hour and forty minutes, and the patient's condition at the close was nearly as good as at the beginning. Reaction had been perfect. The urine first passed after the operation contained 10 per cent. of leucocytes, but was otherwise normal, and two days later absolutely so. The wound had been dressed on the tenth day, and union found complete.

Examination of the blood showed no change, the cells being normal in relation and number, and the hæmoglobin about 65 per cent.

On September 10, just one month from the date of operation, she was allowed to return home, being cautioned about wearing an abdominal bandage, and to rest for another month. She had grown steadily stronger and better, and was entirely relieved of all her symptoms, and he was able to present her to the society in perfect health just seven months after the operation.

The spleen weighed a little over five pounds and a half, and the accessory spleen a half ounce. Thirteen ounces of blood drained away from the spleen. The convex surface measured 12.5 by 9.5 inches, the concave surface 10 by 8, and its circumference 25.5 inches.

Dr. John S. Thacher, who very kindly examined the specimen, reported as follows: "I have studied a number of sections of the spleen, but without recognizing any pathological change in the structure beyond some increase in the relative amount of connective tissue." There being no malarial, tubercular, syphilitic or leukæmic history or symptoms, the description applies to a simple chronic hypertrophy.

Examination of blood on March 1, 1893, showed cells normal. Hæmoglobin increased to 90 per cent.

#### HYDATID CYST OF THE LIVER.

Dr. F. H. MARKOE also presented an Italian boy with a large echinococcus cyst of the liver. The diagnosis had been confirmed by aspiration, when a perfectly clear, colorless, non-albuminous fluid had been withdrawn, which, under the microscope, showed numerous hooklets. The tumor was steadily increasing in size, the aspiration having had no effect on its progress. He proposed to incise and drain the cyst at one sitting, but requested any suggestions from the members of the Society.

OLD DISLOCATION OF HIP JOINT REDUCED BY  
ARTHROTOMY.

The President, Dr. GERSTER, presented a patient with the following history :

Max Weinberg, eight years of age, was admitted to Mt. Sinai Hospital, December 17, 1892. Seven weeks previously he was run over by an express wagon, his left hip being injured. He had considerable pain at the time, and has not walked since. His condition had evidently not been recognized, for, on admission, there was marked inversion of the left leg, a shortening of one and five-eighths inches, and the head of the femur could plainly be felt on the *dorsum ilii*. Previous treatment had consisted in a splint to the leg at the time of the accident, and a plaster-of-Paris splint applied two days before admission. Manipulation of the thigh caused pain, and there was paralysis of the anterior tibial group of muscles. December 20th. Chloroform anaesthesia. Efforts at reduction of dislocation were ineffectual. An incision five inches long was made, the centre corresponding to the great trochanter. Muscular tissues and capsule, nearly its entire length, incised. Head of femur exposed, covered with thin layer of granulation tissue. The base of the head also covered with granulations, and acetabulum almost obliterated by them. A portion of the Y ligament had to be cut away before the head of the femur could be brought by manipulation into the contracted acetabulum. The capsule was closed with catgut, and the wound sutured, except at its centre, where iodoform gauze drainage was instituted. The limb was partially abducted and fully extended, and an extension apparatus was applied.

But slight reaction followed the operation. On the ninth day the wound was dressed. There was no discharge. The wound was clean and aseptic. Three weeks after the operation the patient was out of bed. Passive abduction and rotation outward were limited. Active flexion and extension of the thigh were good; external rotation could not be accomplished. There were talipes equinus and inversion of the foot, and an area of anaesthesia over the whole *dorsum* of the foot. Over the anterior tibial group there was diminished faradic and galvanic reaction. The patient received, on alternate days, galvanic and faradic currents, and left the hospital, February 17th, with but little improvement in the paralytic symptoms.

The head of the femur remained in the acetabulum, and the patient was able to walk well with the aid of a cane.

The case illustrated the important fact that reduction in these cases could be effected without great danger, although this was doubted by many. Schede, who commanded an enormous amount of material in Hamburg, had lately published five cases in which he had attempted reduction of large joints, but he only succeeded in one case, while in the others he had to resort to excision. The speaker had expected to be compelled to excise in the present case, yet reduction was effected easily without it.

On presenting the boy he found that dislocation had again taken place since he had left the hospital. It would be a very simple matter, however, to again expose the acetabulum through the scar and effect reduction, when some means would be taken to prevent recurrence, if such a thing were possible. It seemed that the presence of the mass of granulations in the acetabulum found there at the operation, and the subsequent atrophy and yielding of the capsular cicatrix, were important elements in explaining the recurrence of the dislocation, which, however, differed somewhat in degree from the original condition. The head was now occupying a position close to the margin of the acetabulum, but it was probable that the deviation would be increased in course of time. There was no traumatism to account for the re-displacement.

Dr. V. P. GIBNEY, in discussing Dr. Gerster's case, referred to two cases of old dislocation of the head of the femur on the ilium, in which he had effected resection by incision through the soft parts. The capsule was then sewed up snugly. The entire wound healed perfectly in both cases, yet dislocation took place again in one case after three months; in the other, he believed, after two months. The patients did not leave the hospital, and the dislocation occurred while under treatment, and a treatment that was regarded, too, as efficient, because both had splints, and traction was being made. He could readily understand why the reduction was not permanent.

Dr. B. F. CURTIS said that about eighteen months ago, at St. Luke's Hospital, a small boy came in for a large abscess on one hip of sudden development. It was incised, the joint was found diseased, and was resected. While he was in the hospital another abscess suddenly developed on the other side, and the hip joint became dislocated. The child was in bed at the time. Probably the dislocation occurred during some changes of position. The abscess was opened and found to communicate widely with the joint. The bones were apparently healthy. The ligamentum teres naturally had been

separated, but the other parts were in such good condition that he contented himself with draining the abscess and replacing the bone in the joint. Extension was kept up for some time. There was no recurrence of the displacement, and finally the boy was transferred to the orthopædic department, where he was kept a long time on a double Thomas hip splint. The last heard of him was that he was getting up some movement, and there had been no recurrence of the displacement.

Dr. KAMMERER inquired whether any apparatus was used in this instance, and Dr. Gerster replied in the negative.

Dr. Kammerer asked this question because he once presented a patient before the Section on Surgery of the Academy of Medicine, on whom he had performed resection, and succeeded, after a good deal of trouble, in replacing the neck of the femur in the acetabulum. It was a dislocation of thirteen weeks' standing. The patient has been walking about without apparatus for the last two or three months, and he was sure that the position, which at first was very good, has not improved lately. Inversion is present to a certain extent again, and there may be a slight movement of the trochanter upward. While he did not think there was now any dislocation, that the bone was again up on the ilium, yet he did think it would have been wiser to apply an apparatus immediately, or before allowing the patient to walk about.

### PYLOROPLASTY.

Dr. F. LANGE presented a case of *Chronic Ulcer of Duodenum, followed by Stricture and Gastrectasy. Recovery after Plastic Operation, according to the Heineke-Mikulicz Method:*

The patient, Miss L., dated the beginning of her trouble to the influence of grief and sorrow in 1879. Then her digestion became impaired, she lost her appetite, suffered from flatulence, pain in the region of the stomach, occasional vomiting, and often an outspoken aversion for food. Under medical treatment her condition improved without, however, yielding to recovery, and in 1881, owing to her father's death, all the symptoms became worse again. Great emaciation followed, and several times blood was discharged with the stools. Ulcer of the stomach was diagnosticated, and absolute milk diet for six weeks brought great relief. Mental excitement, sorrow or a dietetic blunder were always followed by a relapse of the symptoms, weakness, and the necessity of prolonged rest.



In 1883 she emigrated to this country, and lived in Texas, where, at one time, she became so ill that, for a number of weeks, she was confined to her bed.

In 1886 she came to New York, and after a prolonged treatment for "ulcer of the stomach" was admitted to the German Hospital, where repeatedly bloody vomiting and stools were observed. After her discharge from the hospital the same varying turn of symptoms would re-appear. Vomiting became more frequent.

In 1888 she was re-admitted and treated for six months. Washing the stomach was then resorted to, and she improved, so that in June, 1889, she was discharged as cured. She then weighed 124 pounds against 92 at the time of her admission, but she was still very susceptible to any irregularity in diet.

In July, 1888, she entered the Training School for nurses, and with the increased work and the impossibility of observing careful diet, her symptoms re-appeared. Of her own accord she resorted to stomach irrigation again, and could hardly do a day without it. Occasionally she noticed that particles of food appeared in the washings that had been taken several days previously, and that sometimes early in the morning large quantities of stomach contents would be evacuated. In this manner, with short intervals of slight improvement under more care, her ailment persisted.

Since September of last year vomiting became more frequent. About January 1 she put herself under the care of Dr. Einhorn, who after careful investigation, examination of the chemical constituents of the gastric juice, and from the history of the case, concluded that there was a stricture about the pylorus, probably of a non-malignant nature, and sent the patient to me for an operation. She was then very much emaciated and despondent. The illumination of the stomach, which Dr. Einhorn had the kindness to show me, as well as inflation of that organ, revealed its displacement as far down as the pubis, while the upper curvature corresponded about to the level of the umbilicus. The pylorus seemed to be a little above and to the right, and a small circumscribed resistance could be felt in this region.

After due preparation laparotomy was done at the Presbyterian Hospital in January. The pyloric region was found thickened by adhesive cicatricial material, which extended somewhat to the right. The incision into the stomach and through the pylorus revealed that the latter was about normal dimensions, but the immediately adjoining

duodenum was narrowed, and an elongation of the cut showed that the main stricture, which would hardly have admitted a thick lead pencil, existed at the distance of about an inch from the pylorus. Undoubtedly a chronic ulcer of the duodenum had preceded this cicatricial contraction. The whole cicatrix was split, and the cut elongated to about three-fourths of an inch into the healthy duodenum, so that its entire length was about two and one-half inches.

The application of the sutures through the hard cicatricial mass was somewhat tedious. A double row of sutures, internal catgut, external silk, was applied and some sutures over that. Buried silk sutures were used for the abdominal fascia. The patient had a slight attack of appendicitis during the second week of her convalescence, which otherwise was in no way disturbed. After three weeks she left the bed, and several days later she left the hospital. All the symptoms of stricture have disappeared promptly, and digestion is perfect.

Dr. Lange has used for gut sutures needles of his own invention for a number of years. They are round, have a small curve, and are not curved where they are caught in the needle-holder. The latter is thin and long-handled, the handle being thin and elastic. A slight pressure is needed to fix the needle. The clamps he used were also demonstrated. Their advantage was the parallel approachment of the blades, which were armed by rubber tubes. He also demonstrated the one advised by Kuester especially for the stomach.

#### RUPTURE OF THE INTESTINE; LAPAROTOMY; THE OPENING NOT FOUND; RECOVERY.

Dr. PARKER presented to the society a case of rupture of the intestines in which he had performed laparotomy with success. The history of the case was as follows:

P. B., forty-two years, single, gardener, was admitted to the Chambers Street Hospital November 19, 1892, at 2 P.M. On the day of admission he received a blow on the abdomen with the fist just above the pubes. Patient said he had eaten for breakfast sausages, fried potatoes and coffee at 10 A.M., and for lunch a dish of soup and some liquor. His lunch was at 1 P.M. He also states that after being injured he immediately doubled up with pain, and felt something give way inside. He then walked across the room, sat down and commenced vomiting. He was helped upstairs, but the pain increased in severity, and he vomited several times.

At 3.30 P.M. the ambulance surgeon found him suffering with severe pain in the epigastric region, but with no external signs of contusion. He was brought to the hospital and put to bed. He was under the influence of liquor at the time of admission. Temperature  $100^{\circ}$ ; small and rapid pulse. He complained of intense pain over the entire abdomen. Hot applications to the abdomen and opiates were ordered. His urine was normal.

At 3 A.M. vomiting became more frequent, pain was growing more intense, pulse more rapid, and he had the appearance of collapse.

3.30 A.M. Ether and the usual antiseptic precautions. An incision four and a half inches long was made in right inguinal region over a small inguinal hernia. Sac exposed, separated from cord and a small semi-solid mass about the size of the end of the thumb was felt in the sac, which, when opened, proved to be a piece of potato. Some whitish-colored, watery fluid escaped, containing some more small fragments of food. The incision was enlarged. The peritoneal surfaces of the intestine were red and inflamed, and showed signs of a commencing peritonitis. No adhesions were present. The intestines were examined as well as possible for rupture without disemboweling or much manipulation.

A second incision was now made in the median line about four inches in length. The abdominal wall was found to be cedematous. The peritonæum was in the same condition, and more whitish fluid was found, containing masses of food which were sponged out of the pelvic cavity. In all, about a pint and a half of fluid was removed. No rupture could be found. Six pieces of sterilized gauze, each piece being one yard long by sixteen inches wide, were then placed between the folds of intestines, which were lifted out of the pelvic cavity. This cavity was filled with gauze. An antiseptic dressing was applied, and the patient was removed to the ward.

November 20. Patient complains of pain in abdomen. Vomited three times. Temperature  $102^{\circ}$ . Pulse fair.

He was sent to the operating room thirty hours after the first operation. Ether was given. The dressing and packing being removed, a considerable amount of fluid containing particles of food came away with the dressing. The intestines and bladder were carefully examined for rupture, but none was found. Both wounds were again packed in the same way with sterilized gauze, and an antiseptic dressing applied. Patient's condition was good. One drachm of

whisky was ordered by the mouth every hour during the night; also two drachms of morphia, U. S. sol.

November 21. Nutrient enema given every four hours. Patient had a good movement of the bowels after one enema. No vomiting. Dressing when removed was saturated with fluid which had an ammoniacal odor. Temperature  $101\frac{1}{2}^{\circ}$ . Passed small quantities of urine about every hour.

November 24. Still a strong odor of urine in dressing. Patient sent to operating room; bladder again thoroughly examined but no rupture found. Wound was washed with Thiersch's solution and packed as before.

November 25. Temperature  $99^{\circ}$ . Dressing still saturated, and has still a strong odor of urine.

November 29. Dressings changed daily. Discharges growing steadily less. Patient put on semi-solid food. Has a movement of the bowels every day.

December 3. Cavity closing rapidly. Patient put on solid food, beefsteak, etc.

December 28. Patient up and about the ward.

This case was reported to show the value of operation and treatment by packing. Undoubtedly there was a rupture of some portion of the gastro-intestinal tract. His condition at the time did not allow of a further exploration. This case exemplified the value of packing in abdominal wounds.

## GASTROSTOMY FOR CANCER OF THE ŒSOPHAGUS.

Dr. WILLY MEYER presented a man, forty-three years of age, on whom he had performed gastrostomy, according to von Hacker's method for deep-seated cancerous stricture of the œsophagus, at the German Hospital, January 9, 1893. He showed the patient mainly with reference to the specimen he was going to present later, which illustrated Witzel's method of gastrostomy.

He had done von Hacker's method six times, always for cancer of the œsophagus, and had not lost one patient in consequence of the operation. The first patient, a man of seventy-two, had lived in comparatively good health for full eight months after the operation. He had been presented to this society one and one-half years ago, and died of an intercurrent pneumonia. Nos. 2 and 6 had died of perforation of the tumor into the trachea between eighth and tenth day

after the operation. No. 4 was operated upon two days previous to the patient now presented (No. 5).

The speaker had always operated in two stages. He secured the stomach with two slings of thin silk, which were held by the assistants in the middle of the abdominal wound, and left in place until the stomach was incised on the second or third day after the operation. The patients were allowed to partake of liquid diet during this time. Rectal alimentation was also resorted to. The incision was always done *with the knife* between the two silk strings as a guide, and made as small as possible, just large enough to admit the smallest-sized drainage tube. He never opened the stomach with Paquelin's cautery, because with it an eschar was made which, when pushed off, rapidly enlarged the opening in the stomach. He believed that this might possibly be the reason why von Hacker saw such an early leakage in his cases and needed a special stomach canula with double rubber balloon (the von Hacker-Scheimpflug canula). Dr. Meyer's patients had worn a simple rubber tube (large size) in the fistula. The tube, as also seen in this case, fully occluded the opening. No leakage and no ezema of the skin surrounding the tube had set in. According to his observations the small, incised wound in the stomach first enlarged rather quickly, its borders probably being digested by the gastric juice. A tube three times as large as the first could be easily put in after about eight days. But soon, as it appeared, with advancing cicatrization the limit was reached; no larger sized tube was needed; the fistula became patent. Very rarely slight leakage intermittently set in afterward. If then the tube was entirely removed during sleep, the stomach meanwhile being kept empty, the fit was again perfect on the next day. Of course, the von Hacker-Scheimpflug canula would be preferable to the simple tube. So far, however, it took quite some time in New York before the instrument maker had finished his task, especially on account of the slow work of the rubber companies. Lately, a glass tube had been recommended from Miculicz's clinic. The speaker had not yet tried it. A method of performing gastrostomy, where, as it seems, leakage was never observed, was that of Witzel.

His patient had gained since the operation. He now and then was able to swallow even bread and chopped meat through the oesophagus. At other times he was unable to bring down even fluid. Lately he had learned to chew his food and make it slippery with saliva and then to blow it through the tube into his stomach.

Dr. LANGE had employed this method in a recent case, and found it useful. The operation was not done at two times. The muscles were separated according to the method suggested by von Hacker. In this case the adaptation of the circumference of the canal to the elastic tube was very accurate, and the patient did not lose any food from the first day. A few drops escaped in the beginning, but not enough to be of any consequence. He tried to protect the parts by bismuth powder and an outer covering of vaseline.

Dr. KAMMERER said that in one case where it was necessary to open the stomach at once, doing a single operation, the patient being

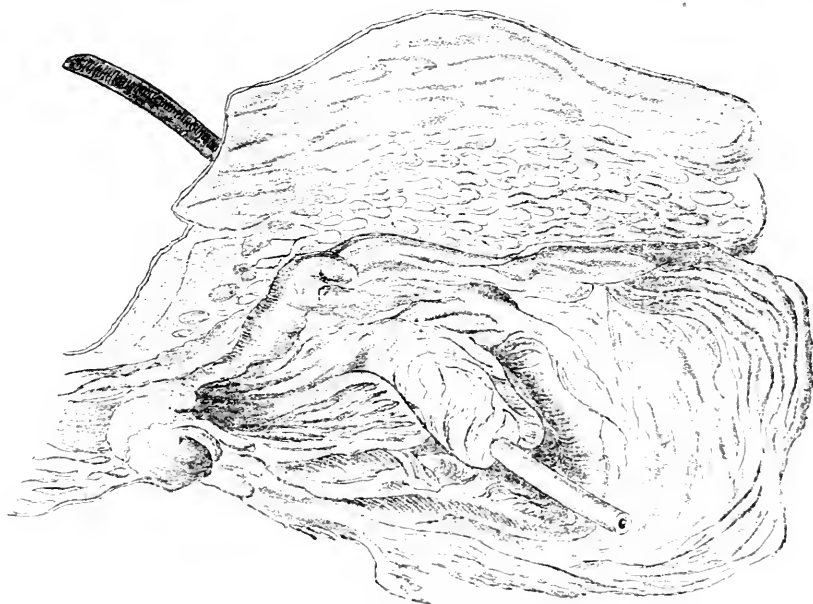


FIG. 1.—Specimen from Dr. Meyer's case of Gastrostomy—View of interior of stomach, showing oblique manner in which tube passes through the wall of the stomach when introduced by Witzel's method.

greatly emaciated, he had employed what he believed was Braun's device, dividing the different layers of the stomach one after another, and stitched each one as it is divided to the walls of the abdomen, stitching the outer wall of the stomach to the peritonæum and fascia, and so on, finally severing the mucous membrane of the stomach and suturing it to the outer integument. He regarded that as a very good method, one which would prevent infection of the peritoneal cavity.

Dr WILLY MEYER also demonstrated the cesophagus and stomach of a man, fifty-nine years of age, on whom gastrostomy had been performed by him according to Witzel's method for cancerous stricture of the cesophagus at the German Hospital, on January 23, 1893. (Fig. 1.).

Four methods of performing gastrostomy are recognized at the present time:

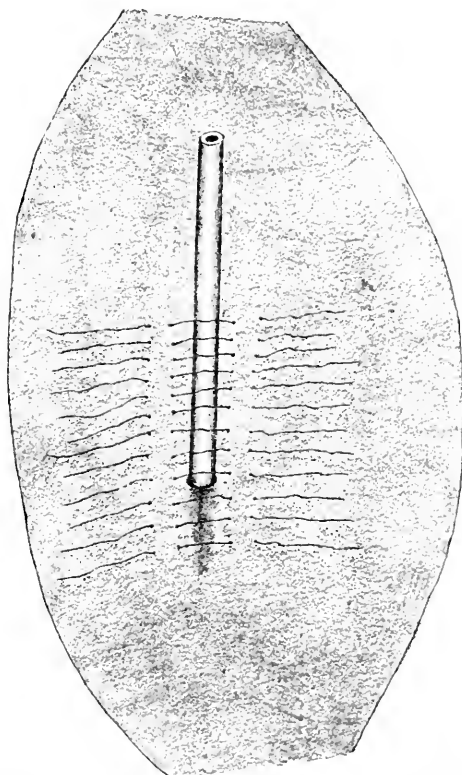


FIG. 2.—Witzel's method for Gastrostomy, showing application of sutures in wall of stomach embedding tube obliquely therein.

(1) That of Fenger.

An incision is made parallel to the left border of the ribs, with division of the abdominal wall in the same line, and stitching of the stomach to this wound. The opening of the stomach is done at the same sitting, or two days later. This operation was at present practically abandoned, on account of the difficulty in preventing

leakage. Dr. Meyer had performed it only twice, and had also been greatly annoyed by that symptom.

(2) That of von Hacker. First recommended in 1886.

A longitudinal incision is made to the left of the linea alba, with blunt division of the belly of the rectus muscle, and suturing of the stomach to the borders of the peritoneal wound. The rectus muscle acts as a sphincter. (By crossing the fibres of this muscle the muscular occlusion can be still improved. Girard.) Its merits and defects had been mentioned before. Dr. Meyer had performed it six times, and was greatly pleased with it on account of its easy and rapid performance.

(3) That of Hahn, published in 1890; first performed in 1887.

Fenger's incision is employed with a second cut in the eighth intercostal space in the para-sternal line. The stomach is pulled forward into this wound and fastened by stitches between the two cartilages. Hahn performed the operation eight times up to 1890, and was pleased with its results. Von Hacker (2) and Hadra (1) saw necrosis of the cartilage after it. It seemed that the operation did not come into favor.

(4) That of Witzel. First published in 1891.

His operation consists shortly in the following: Fenger's incision and blunt division of that portion of the rectus muscle which is in the line of the incision, and of the transverse muscle, of course in the direction of their fibres (the latter muscle will appear in this spot as a muscle only in very robust patients). Division of the peritonæum. Primary incision of the stomach by a very small hole. Into this opening a snugly-fitting rubber tube is at once introduced, and then buried in the wall of the stomach to the extent of from one to one and one-half inches, by stitching over it two folds of the stomach wall, as seen in the diagrams (Figs. 2 and 3). These folds run from the left down to the right end upward. The entire area is then stitched to the peritoneal wound by interrupted sutures, thus rendering the operative field extra-peritoneal, and the abdominal wound is closed. Witzel had thus operated on two patients for stricture of the œsophagus with perfect success. The patients were fed through the tube right after the operation, and at no time had there been any leakage. He even removed the tube after nourishment had been poured into the stomach, and re-introduced it temporarily when the next meal was due. The patients remained perfectly dry. Witzel explains this important and interesting phenomenon by assuming that a valve-like occlusion was most probably formed at the inner opening of the fistula by the mode



of burying the tube. Lately, Miculicz had published, by his assistant, von Noorden, five cases which had been successfully operated upon in this way. He recommended Witzel's method as being the best known at present. None of his patients ever observed the slightest leakage. In one who had been operated upon for cicatricial stricture of the oesophagus, the fistula closed spontaneously within sixteen days after the oesophageal stricture had been successfully stretched and the tube in the stomach removed. A special second operation for this purpose had thus been rendered unnecessary.

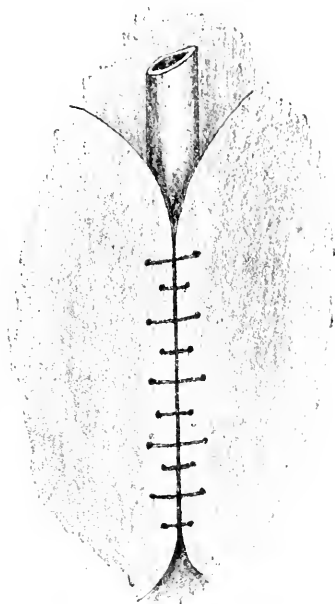


FIG. 3.—Sutures tied completely embedding tube for same distance.

Dr. Meyer's patient stood the operation very nicely. He was fed through the tube immediately after the operation, and later on at regular short intervals. In spite of very frequent and hard coughing spells no regurgitation occurred at any time. A small strip of iodoform gauze had been put alongside the tube at the time of the operation, before the external wound was closed by stitches. This was removed on the third day. The wound had healed by primary union. The patient had had a putrid bronchitis at the time of the operation, and had been unable to swallow even fluids for two days. On the third day after the operation the temperature suddenly rose. Pneu-

monia developed. He died on January 26, five days after the operation. Post-mortem showed bi-lateral pneumonia; no symptoms of peritonitis.

The specimen is of great interest. It fully corroborates Witzel's explanation and the condition found in one of Miculicz's cases at the post-mortem. As seen in Fig. 1,<sup>1</sup> a short artificial cone (*a*) obliquely protrudes into the lumen of the stomach. It is formed by the stomach wall itself, and is produced by the peculiar and ingenious mode of stitching the same over the tube. It is evident that even when the rubber tube is removed the intra-gastric pressure must close this internal entrance to the fistula by pressing its two walls upon each other. A perfect organic valve is formed. It is of interest to state that, according to Miculicz's observation, the outer and inner openings approach each other in the course of time, so that the tube later enters the stomach in a straight sagittal direction, not, as at first, obliquely. Nevertheless, the valve has been continually found to work with perfection. Ten days ago the speaker had operated a second time in this way on a woman forty-three years old, also for cancer of the cesophagus. She had enteroptosis. The operation took longer than anticipated, on account of some difficulties encountered in lining the field of the stomach with peritonæum. The pulse, already 120 before the operation, did not improve later. The patient gradually sank and died of heart failure thirty-six hours after the operation. Post-mortem had been refused. Dr. Meyer believed that von Hacker's method might have been rather indicated and probably better borne. Witzel's operation required some more time in its performance. We certainly have to individualize in selecting the mode of procedure. But, as it seems, Witzel's method insures the best results.

<sup>1</sup> The drawing has been made from the specimen. It shows the interior aspect of the anterior stomach wall. I am indebted to Dr. E. Frei, of the house staff of the German Hospital, for his nice work.

## EDITORIAL ARTICLES.

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### ON SOME FALLACIES INHERENT IN THE PARASITIC THEORIES OF THE ETIOLOGY OF CARCINOMA.

WITHIN these last few years, in which the science of bacteriology has made such mighty strides, the etiology of many diseases, which before had been obscure, has been placed on a sound basis by the irrefutable demonstration of their bacteriological origin; and, at the present time, so many diseases have been referred to the kingdom of parasites for their etiology that it has almost seemed that ere long the most of pathology must have for its basis some of the lower vegetable or animal forms. Observing the tendency of this great current, many far-seeing pathologists have hinted at the bacteriological origin of this or that disease, and have won glory when, in the course of time, their wise predictions have been conclusively proven and universally accepted. So striking have been these revelations that it would seem that one could scarcely go amiss in surmising at etiology along this line. This enthusiasm has led a host of pathologists, who, observing the already demonstrated causes of the gumma, the tumor albus, the xyloma, the actinomyces granuloma and many others, to seek for similar causes in other tumors of unknown origin.

The great amount of study which has been given to the subject of carcinoma has, as yet, failed to establish sufficiently the nature of the disease. The theory of Cohnheim, incomplete as it is, stands at the present time for our most advanced views on the subject. The parasitic theory of the etiology of carcinoma was long ago hinted at. In 1847 Virchow observed the peculiar minute bodies between the parenchyma cells and also within the cells themselves, which have since been identified as sporozoa.<sup>1</sup> This unicellular animal body has of

<sup>1</sup> Virchow's Archiv, Bd. 33.

late been the object of much observation. It has been given its biological place among the gregarinidæ. Pfeiffer<sup>1</sup> observed bodies which he called sporozoa in both sarcoma and carcinoma. This same class of parasites has been discovered in certain skin diseases, and notably those in which there is a tendency to heterogeneous proliferation of epithelial cells. Wickham,<sup>2</sup> Darnier,<sup>3</sup> Hacke,<sup>4</sup> Malassez and Albarran,<sup>5</sup> Steinhause,<sup>6</sup> Strobe,<sup>7</sup> Vincent,<sup>8</sup> Foa,<sup>9</sup> Van Henkelom<sup>10</sup> and Thoma,<sup>11</sup> have all reported such parasitic cells in carcinoma, and the first two observers have regarded them as the probable cause of the disease, though they cannot be demonstrated as etiological factors, nor have cultures or inoculations been made. On the other hand, Russel, Pifford, Schutz,<sup>12</sup> Cornil,<sup>13</sup> Hausemann,<sup>14</sup> Török, Ribbert,<sup>15</sup> Tommasoli, Duplay, Cazin and others, who have observed these bodies, incline to regard them not as parasites, but as products of cell degeneration or as karyokinetic nuclear changes.<sup>16</sup>

Within the past year three works on the subject, by Podwyssozki and Santschenko,<sup>17</sup> Sondakewitsch<sup>18</sup> and Noeggerath,<sup>19</sup> have appeared.

<sup>1</sup> Zeitschrift für Hygiene, 1888, III, 3: IV, 442.

<sup>2</sup> Archives de med. experimentale, 1890, I, I.

<sup>3</sup> Centralblatt für Path. Anat., I, 682.

<sup>4</sup> Soc. de Biolog., Nov., 1890.

<sup>5</sup> Soc. de Biolog., Apr., 1889.

<sup>6</sup> Virchow's Archiv, Bd. 126, s. 533.

<sup>7</sup> Zeigler's Beiträge, 1891, XI, Heft I.

<sup>8</sup> Annales de Micrograph, 1890, II, p. 10.

<sup>9</sup> Gazz. degli Osp., No. 14.

<sup>10</sup> Centralblatt für Path. Anatomie, 1890, p. 704.

<sup>11</sup> Fortschritt der Medicin, 1889, p. 413.

<sup>12</sup> Microscopische Carcinombefunde, Frankfurt, 1890.

<sup>13</sup> Journal de l'anat. et de physiol, 1891, No. I.

<sup>14</sup> Virchow's Archiv, Bd. 123, p. 356, 1890.

<sup>15</sup> Deutsche med. Wochenschrift, 1891, p. 1179.

<sup>16</sup> Park: The Parasitic Theory of the Etiology of Carcinoma: N. Y. State Med. Soc. Transact., 1893.

<sup>17</sup> Centralblatt für Bact. u. Parasitenkunde, 1892, Nos. 16-18.

<sup>18</sup> Annales de l'Institut. Pasteur, 1892, T. VI, No. 3.

<sup>19</sup> Wiesbaden: J. F. Bergmann, 1892.

The first two speak with great assurance on the presence of parasites in carcinomatous cells; though, after their exhaustive research, they conclude that neither the observers, who claim the presence of sporozoa in carcinoma, nor those who deny their presence, have sufficient ground for their dogmatic claims. Stroebe,<sup>1</sup> who has observed and delineated these bodies, does not feel convinced of their parasitic nature, because of the difficulty of excluding the question of nuclear degeneration.

Observations have also been made in the line of the discovery of bacteria in carcinomatous growths. Rappin claimed to have discovered a diplococcus as the cause of carcinoma, and even to have inoculated rabbits with positive results. Scheurlen<sup>2</sup> found a spore-forming "carcinoma bacillus," which he was able to cultivate on gelatine and potatoes. But these observations have been long since thrown aside, either on the ground of inaccuracy or the want of further proofs.

Finally, we have the elaborate researches of Adamkiewicz, just published.<sup>3</sup> The widespread attention which they have received, and the immediate clinical application to which they have been put, entitle them to a more complete analysis in this paper. Adamkiewicz holds that carcinoma presents all the characteristics of a chronic infectious disease, but not being able to discover the parasite of the disease, we have too readily fallen back upon the old hypothesis of Cohnheim. He refuses to recognize carcinoma cells as identical with epithelial cells, and points out that they present three forms in the course of their development. The young form is that resembling the leucocytes; in a higher stage of development they approach the epithelial cells; and, lastly, they become carcinoma cells, with their tendency to the formation of irregular projections, and finally to degeneration and disintegration. This degeneration in the later stages he regards as a feature of differentiation from the epithelial cells. He

<sup>1</sup> Ziegler's Beiträge, Bd. XI, Taf. 1.

<sup>2</sup> Deutsche med. Wochenschr. 1887, No. 48.

<sup>3</sup> Untersuchungen über den Krebs und das Princip seiner Behandlung, 1893.

assumes that carcinomatous tissue possesses toxic properties, and proves it by inoculating animals with bits of tumor and by injecting filtrated watery extracts, producing death in a few hours or days. This special poison he has called *cancroin*. It seems, without doubt, to him that carcinoma is a parasitic disease. The parasite not growing on the usual culture media, he undertook the use of living tissue in its stead, and planted bits of carcinoma in the brains of rabbits.

The carcinoma cells were observed to migrate from the implanted particles in the direction of the least resistance along the clefts in the brain substance, to become implanted and form nuclei for further propagation. Therefore, he concludes that the carcinoma cells are to be regarded as living creatures, and are themselves the specific parasites of the disease. To this parasite he has given the name *coccidium sarcolytes*, and this is the source of the *cancroin*, the irritating action of which causes the changes in normal tissue.

When we now come to sum up these observations, we see the very conflicting opinions of accurate observers, and the diametrically opposite conclusions at which many have arrived. The theory of the bacteriological origin of carcinoma gave place, among those who sought for a parasitic etiology, to the sporozoa or coccidia. Against these stand the views of the great number of observers who believe that these bodies, which have been interpreted as animal parasites, are the products of disintegrated nuclei, or nuclei in the process of mytosis. The whole evidence of their parasitic nature is based upon the insufficient ground of their appearance within or among the carcinomatous cells. They have not been isolated or cultivated outside of these cells. The microscopic appearance alone is inadequate for the basing of such a conclusion. For example, I may cite the deception occurring in fat cells, by which the intra-cellular septa, when stained, present the appearance of tubercle bacilli, a thing which Orth has regarded of sufficient importance to be made the subject of an essay. The pronounced tendency of carcinoma cell nuclei to disintegrate, and the mytoses occurring in the younger cells may well account for these peculiar appearances.

The fact that certain granulation tumors are of infectious origin does not justify the conclusion that carcinoma, clinically and histogenetically different, has a similar cause. The transplantation or infection with carcinoma cells is nothing more than can be done with the skin, periosteum or other tissues, and occurs in the benign as well as malignant growths. With the granulation tumors it is different. A secondary growth of tubercular or syphilitic tissue is not brought about by the transplantation of the cells making up the growth, but by the transplantation of the specific micro-organisms by the blood, lymph or other channels, the irritating products of which give rise to the peculiar productive inflammatory process. The cells of such a secondary deposit are by no means descendants of the cells of the primary growth as are those of carcinoma, which, when implanted remote from the mother tumor, continue to produce cells of the parent type, the pre-existing cells taking no part in the formation of the characteristic parenchyma. The only means by which secondary deposits can form from carcinoma is through this transplantation or metastasis of carcinoma cells, which is facilitated by the peculiar anatomical nature of the tumor. If, then, there are specific parasites for carcinoma, they must possess a predilection for epithelial cells, and be transmitted by the cells to the localities in which metastases develop, and yet not invade the cells of this new locality, even though they be epithelial in character. The parenchyma of a metastasis in the liver of an epithelioma of the tongue presents the peculiarities of epithelial cells of the tongue. The flat epithelial cells proliferate among the polyhedral liver cells, which play only a passive part.

It has been my fortune to observe a primary carcinoma of the liver with multiple secondary deposits. On cutting into these secondary nodules, which were scattered along the post-peritoneal lymphatics, a greenish-yellow fluid exuded which responded to the tests for bile, and the cells of these nodules were anatomically identical with liver cells. Examples of this sort, showing that in the metastases of carcinoma the parenchyma repeats the type of the epithelial cells from which the

primary growth sprang, might be indefinitely multiplied. These facts speak against the microbic theory of carcinoma, and quite refute the doctrine of Adamkiewicz, which asserts that the characteristic neoplastic cells themselves are not epithelial cells, but are parasitic bodies. How he accounts for these bile-secreting parasites is hard to conceive. Furthermore, it is not difficult to make a section at the edge of a carcinoma, including some of the normal tissue, in which the normal epithelial cells may be traced as directly anatomically continuous with the parenchymatous cells of the neoplasm. The same thing is seen in the adeno-carcinomata so common in the stomach and rectum, in which adenomatous cells merge into the carcinomatous cells.

If the parasitic theory be accepted, it must be reconciled with the other malignant tumors, and also with the so-called benign growths which give rise to metastases, and which have so much in common with carcinoma. The fact that the carcinomata are anatomically related through the endotheliomata and peritheliomata to the malignant sarcomata on the one side, and that they are allied through the adeno-carcinomata to the benign adenomata on the other side, places another difficulty in the way of this hypothesis. This similarity may be further traced in the etiological factors strikingly common to all tumors, which may be spoken of as mechanical or chemical irritation, or influences which hinder in some way the development of cells within their normal limitations. The epithelioma of the lower lip of pipe smokers, the chimney-sweep's carcinoma scroti, the "paraffine cancer" of paraffine workers, carcinoma of retained testicle, epithelioma of the tongue opposite the sharp edge of a carious tooth, are but a few of the well-known examples. In scar tissue of the soft parts develop carcinomata or sarcomata; at the seat of fractures appear chondromata, osteomata or sarcomata; from chronically inflamed mucous membranes develop polypi, adenomata or carcinomata; and so on examples might be multiplied. The tendency of an heterogeneous proliferation of epithelial cells at the seat of a lupoid inflammation gives a glimpse of bacterial products acting as a cause of epithelial misdevelopment. In the edge of a healed gastric ulcer the



epithelium is observed to send down chains infiltrating the underlying tissue. As a rule, this carcinoma-like condition gives rise to no further growth, but when, for some reason, the physiological equipoise between the aggressive tendency of the epithelium and the resisting tendency of the surrounding cells becomes disturbed, from precisely this locality carcinoma develops.

Nor do the malignant tumors alone give rise to metastases, for multiple developments of chondromata, lipomata, fibromata, myomata, papillo-cystomata and, in fact, all the new growths, benign or malignant, have been observed to proliferate in this manner.

It would be superfluous to multiply evidence showing the etiological and anatomical features common to all tumors. No parasitic origin can be suggested for any of these excepting carcinoma; and in view of this fact, and in view of the fact that the evidences of the parasitic etiology of carcinoma are so imperfect, we must still regard the new growths as either belonging to the class of misdevelopments, or as being due to some cause exciting the fixed cells to a greater than normal activity.

The most plausible of parasitic theories is that of the sporozoa. Its right to consideration as an etiological factor of carcinoma is, however, nullified by the fact that its champions are contradicted by an equal number of equally accurate observers. The doctrine of the bacterial cause is to-day quite unchampioned; and, finally, the theory of Adamkiewicz is unnatural and illogical. The hypothesis of Cohnheim, though not histologically substantiated, still stands as accounting for many inexplicable phenomena. It is, however, within the range of the greatest probability that the cause of tumors has been sought for too wide away from the real nature of things, and that it lies nearer the ordinary and constantly operating phenomena, and not among the rarer and more remote biological possibilities. In such simple growths as clavus no far-fetched etiology is sought, but simple mechanical irritation satisfactorily accounts for the piling up of epithelial cells. May we not presume, then, that chemical or mechanical irritation, *per se*, may be a cause of carcinomatous

degeneration without complicating the etiology still more by the hypothesis that such irritation is a cause only as it impairs the cell vitality and renders it an easier prey for the specific micro-organism? The expression "irritation," for want of a better term, must stand for inflammatory processes giving rise to parenchymatous or interstitial cellular changes.

Mr. Darwin has shown that habits or induced conditions acting continuously through a number of generations finally become engrafted upon the line, and are transmitted as instincts or inherent qualities; and is it not possible that epithelial cells, which for a series of generations have propagated under such abnormal conditions as have caused and as exist in a primary carcinoma, may become endowed with the pernicious vitality which finally characterizes the metastatic growth?

JAMES P. WARBASSE.

#### WILLIAMS ON PAPILOMATOUS TUMORS OF THE OVARIES.<sup>1</sup>

UNDER this head the author treats separately the two varieties of growth, (1) papillomatous cystomata, and (2) the superficial papillomata.

First taking up systematically the cystomata, he begins with the history. The gross anatomy and site are then considered. Contrary to the teaching of Olshausen, he believes that the majority of these growths are not intraligamentous, but pedunculated. Another point of difference between these growths and the glandular cystomata lies in the fact that in nearly half the cases they are bilateral. They rarely attain the huge proportions of the latter, rarely exceeding a man's head in size; and are usually composed of a much smaller number of cysts.

An admirable description of the histological anatomy is given. The author attaches little importance to the presence of cilia on the epithelium which covers the papillæ and lines the cystic cavities. He

<sup>1</sup> The Johns Hopkins Hospital Reports, Vol. III., 1892.

shows that their presence is purely accidental, and no ground for subdividing these tumors into two classes, as Olshausen and Von Velits have done. Attention is called to the psammoma bodies occurring in these growths, which can in no wise be regarded as pathognomonic.

The author has added a very valuable contribution to the knowledge of the histogenesis of papillomatous tumors of the ovary. The number of theories which have thus far been advanced are limited only by the number of structures entering into the anatomy of the ovary. All of these, and even the Wolffian body, have been regarded as possible sources of these growths. After discussing these theories, he goes on to show that the papillomata are not always derived from the same source, and consequently that those observers who advocate any one source of origin in all cases, although basing their statements on observed facts, take a too narrow view of the subject. Papillomatous cystomata may possibly arise from the relics of the Wolffian body, but positive proof has never been established.

To show that the epithelium of the Fallopian tubes may be a source of origin, the author brings to bear a case in which he discovered in the mesosalpinx a small papillary cyst and also numerous ducts of the same structure, the lining epithelium of which he was able to trace as continuous with the epithelium covering the fimbriated end of the tube, from which they were clearly outgrowths. He has also discovered ingrowths of the germinal epithelium into the ovarian stroma forming cystic cavities lined with ciliated epithelium, and from the inner walls of which papillomatous projections were springing.

Furthermore, he establishes that the Graafian follicle is a source of these cystomata. Among the specimens cited is one in which there is a Graafian follicle lined with its typical membrana granulosa, and from which several small villous projections arise. This represents the earliest stage of development of a papillary cystoma from a Graafian follicle. Another specimen shows a follicle 7 mm. in diameter, situated on the anterior surface of the ovary, which on section is seen to contain a papillomatous growth arising from its

internal wall. Further specimens show that not only non-ciliated but also ciliated papillomatous cystomata, and even intraligamentous papillomatous cystomata may arise from the Graafian follicle. The fact that Williams has discovered Graafian follicles lined with ciliated epithelium justifies the conclusion that the ciliated or non-ciliated condition of the epithelium is a matter of no importance. These cystomata he concludes are by no means of rare occurrence, but constitute about 10 per cent. of all large ovarian tumors.

In speaking of the clinical history, he says that unless the papillomatous growths are developed within the folds of the broad ligament, or have led to the formation of secondary growths, their clinical history does not differ essentially from that of the glandular cystomata. Indeed, the only respect in which the symptoms of an unruptured, pedunculated papillary cyst differ from those of a glandular cystoma is that the former are usually of smaller size and slower growth.

The most prominent symptom, and the one which serves to direct the attention to this variety of growth, is ascites. In some rare instances it occurs without any sign of rupture of the cyst and consequent diffusion of the papillomatous masses over the peritonæum; but in the vast majority of cases its occurrence indicates the formation of metastatic deposits. The perforation of the cyst may be due in some instances to traumatism, but in the vast majority of cases it is due either to atrophy or fatty degeneration of the cyst wall, or directly to the internal pressure exerted by the rapidly-growing papillomatous masses.

He further states that where once the papillomatous growths have broken through the cyst wall, the growth of the papillary processes may so exceed that of the cyst that it gradually disappears, and can only be discovered after a close search as a thin ring about the base of the papillary masses. Occasionally the perforation of the cyst may take place into the adjacent organs instead of into the peritoneal cavity, and the papillomatous masses may then protrude into the bladder, rectum, or even into the cavity of the uterus or vagina.

Marked hydrothorax, he states, is often a prominent symptom. It is not usually due to a metastatic affection of the pleuræ, but

appears to be merely an extension of the abdominal ascites. Finally, papillomatous cysts are very prone to become carcinomatous, and thus become anatomically, as well as clinically, malignant. Some of the carcinomatous papillary cysts may contain such an abundance of psammomatous material that their sandy character becomes a very striking characteristic.

From the facts brought forward in connection with the question of metastases, it is shown that secondary growths may have their origin by mere continuity of growth, by implantation of bare particles of the tumor upon the peritonæum and by the formation of true metastases.

In view of the marked tendency of these growths to secondary development, to the production of ascites, their liability to become carcinomatous and the excellent results following operation, even after dissemination of the growth over the peritonæum, Williams believes that there can be no hesitancy in stating that the only treatment is the earliest possible extirpation of the growths, and that even the presence of marked ascites and secondary growths should not be regarded as a contraindication so long as the patient has any reasonable prospect of recovering from an operation.

The superficial papillomata of the ovary he believes not to be so rare as they have heretofore been regarded. Although not more than ten cases have been reported, he himself has met with five cases of this variety; and he is inclined to regard it as a much more frequent occurrence than is generally supposed. The structure of these superficial growths is identical with those which occur within cysts. They may be sessile or attached by a pedicle of variable length. The epithelial covering may or may not be ciliated. Small cysts and canals, which are often continuous with the surface, are met within these superficial masses. In all probability the epithelium of these papillomata is derived from the germinal epithelium.

These tumors he believes to be very closely related to one another, if they do not belong absolutely to the same class. A point of difference between the two varieties is, that in the superficial sort the production of ascites and the formation of metastases occur at an earlier period, which is explained by the anatomical structure.

The author groups together, as follows, the salient features of the two forms :

1. Most papillomatous cystomata are not developed within the broad ligament, the majority of intraligamentous papillomatous growths being of other than ovarian origin.

2. These growths are derived either from the Graafian follicle or germinal epithelium ; their origin from the Wolffian body or from the tubal epithelium, while possible, has yet to be demonstrated.

3. As the origin of both the ciliated and non-ciliated papillomatous growths is identical, there is no justification for considering them as constituting two distinct classes of growths.

4. Polymorphism of the epithelium is not characteristic of ciliated papillomatous growths.

5. The formation of psammoma bodies is not pathognomonic of the ciliated papillomatous cystomata, for they occur in the superficial and non-ciliated varieties, and also in the normal ovary and tube, as well as in other parts of the body.

6. Superficial papillomata are of far more frequent occurrence than is generally supposed.

7. They are very closely related to the papillomatous cystomata, and are always derived from the germinal epithelium.

8. All varieties of papillomatous growths of the ovary have a marked tendency toward the formation of secondary growths. The majority of secondary growths are produced by mere extension of the growth by continuity of tissue, or by implantation of small particles of the tumor upon the peritonæum. In rare instances, true metastases may be formed.

9. The papillomatous tumors possess a marked tendency to become malignant, and even the anatomically-benign growths, in view of their tendency to the formation of secondary growths, are to be considered as clinically malignant.

10. The results of operations, even after the formation of secondary growths upon the peritonæum, are quite satisfactory.

JAMES P. WARBASSE.

## INDEX OF SURGICAL PROGRESS.

### GENERAL SURGERY.

**I. Compression of the Phrenic Nerve as a Means of Arresting the Vomiting of Surgical Anæsthesia.** By Dr. B. Joos (Winterthür, Switzerland). The writer has found compression of the phrenic nerve to be invariably successful in arresting the hiccough and vomiting of surgical anæsthesia. He usually exercises compression upon one side only, the left, by placing the end of the thumb immediately above the sternal extremity of the clavicle, while the thumb is held parallel with the clavicle, and the rest of the hand lies upon the patient's chest wall. Compression of the phrenic nerve is done, continuing it for a time after cessation of the phenomena, in order to prevent their return. He also suggests it as possibly efficacious in sea-sickness. Professor Leloir, of Lille, France, has used it with advantage in cases of incoercible hiccough.—*Le Semaine Médicale*, No. 9, 1893

**II. Spontaneous Cure of Cancer.** By Professor THEODORE BILLROTH (Vienna, Austria). Billroth presented a case before the Imperial Royal Society of Physicians, of Vienna, where a carcinoma had spontaneously transformed itself into a cicatrix. The patient, a woman of fifty years, seven years previously had observed a nodule in the neighborhood of the nipple, which progressively increased in size to attain, finally, the size of an apple. The breast became blackish in color, dried up, and fell off as if it were mummified. During the last two years the tumor has diminished in volume, and now there only remains an indurated zone around the cicatrix. Billroth showed a series of drawings representing analogous atrophic processes in other neoplasms. He has never observed this transformation to occur in sarcomata. Professor Stoerck related a case of

epithelioma of the tonsil which underwent a complete spontaneous disappearance. A recurrence a year after necessitated a resection of the lower jaw. Professor Kundrat stated that lymphosarcomata also were liable to atrophic processes. Professor V. Schrötter ascribed the result in Stoerck's case to be an arsenical "course." Professor Kaposi spoke of the variety of epitheliomata known as serpiginous, and, especially, relatively prone to heal over.—*Le Bulletin Médical*, No. 11, 1893.

**III. Arsenic in Cancer of the Skin.** By Professor LASSAR (Berlin). Lassar presented before the Berlin Medical Society two cases of cutaneous cancer where arsenic, Fowler's solution, either internally or subcutaneously, produced a complete cure. No surgical measure was undertaken, hence the whole credit is to be ascribed to arsenic alone. He also refers to a third case where a similar result was obtained.—*Münch. med. Wochenschr.*, No. 4, 1893. Dr. K. Touton, of Wiesbaden, reports in the *Münch. med. Wochenschr.* No. 2, 1893, a case of general sarcomatosis of the skin, of leukæmic or pseudo-leukæmic origin, which was successfully treated with arsenic.

## HEAD AND NECK.

**I. Local Influence of some Antiseptics upon the Brain.** By Professor ADAMKIEWICZ (Cracow, Poland). The writer has experimented with regard to the local influence of antiseptics upon the cerebral substance. Carbolic acid, corrosive sublimate and boric acid were especially investigated. He concludes that the first two are dangerous, and possibly, under circumstances, fatal in the disinfection of cerebral wounds, while boric acid, even in a 5 per cent. solution, is devoid of danger. The treatment of cerebral wounds, on account of the fine histological structure of brain, requires certain antiseptic precautions, in default of which "danger to health or life may result."—*Medizinische Neuigkeiten*, No. 3, 1893.



**II. Intra-cerebral Abscess after Otorrhœa Operated on Successfully.** By Professor TERRILLON (Paris). A man, forty-six years of age, was seized with the grippe in 1880, with consecutive otorrhœa, which, since then, has been continuous. In December, 1890, he was taken with pains in the temporal region, with vertigo and tendency to syncope. These pains were worse of nights, and continued to increase progressively in severity for a month; no mastoid complication. Then, after a painful crisis of headache, the patient was seized with fever of great intensity, and fell into a comatose state. Trepanation 3 cms. in front of and above the auditory canal, with following puncture, posteriorly, 5 cms. into the cerebral mass, evacuated 30 grms. of a greenish brown pus. Incision and the ordinary after-treatment caused the fever to fall. The patient remained comatose for three days, after which he recovered slowly, to be convalescent in three months.—*Le Bulletin Médical*, No. 1893.

Dr. K. POULSON, of Copenhagen, has recently published a very comprehensive article on the "Cerebral Complications of Purulent Inflammations of the Middle Ear." The original article appeared in Danish.—*Nordiskt. Medicinskt. Arkiv.*, Bd. 22-23, yet a resumé is given in French, and the same is abstracted, in English, in the *Review of Insanity and Nervous Disease*, 1892.

F. H. PRITCHARD (Norwalk, Ohio).

**III. The Retrobuccal Method for Reaching the Third Branch of the Trigeminal Nerve at the Foramen Ovale.** By Prof. KROENLEIN (Zurich). Thiersch's method of evulsion of the branches of the fifth nerve is likely to rival resection. When the third branch alone is to be removed, Kroenlein advocates the following procedure: The patient's head is placed on the side so that the affected side of the face is turned toward the operator. The line of incision commences one centimeter from the angle of the mouth, and ends one centimeter in front of the lobe of the ear. This incision

separates the skin and subcutaneous cellular tissue; the buccinator muscle and the mucous membrane of the mouth remain intact. The masseter is separated in the same direction, from the front backward, to the extent which it is uncovered by the parotid. The latter, together with Steno's duct, are not injured. The base of the coronoid process is now identified and isolated by means of an elevator. It is then divided by means of a pair of strong bone-cutting forceps as deeply as possible. It is then drawn directly upward with the attached portion of the temporal muscle; the nerve area is thus exposed. This may now be isolated with the handle of the scalpel. To facilitate this the adipose tissue of the cheek, as well as the deeper adipose tissue covering the nerves on the lateral side of the internal pterygoid muscle, is loosened up to the external pterygoid. The lingual nerves must now be felt for at the inner side of the inferior maxilla, and it, together with the inferior dental nerve, identified. Usually both may be loosened and followed in an upward direction to the upper edge of the external pterygoid. The chorda tympani can also be sometimes identified, as well as the internal maxillary artery, where it passes over the inferior, dental and lingual nerves. In order to follow this further in a central direction, it is necessary either to strongly retract in an upward direction the external pterygoid muscle, or to separate some of its fibres. The internal maxillary artery may be ligated, if found to be in the way, and divided. The nerves found in this region, as they surround the middle meningeal artery, are followed to the base, and resected or evulsed. The coronoid is replaced, and the wound sutured and drained.

Kroenlein does not design this operation to replace his previously suggested procedure for resection of the second and third divisions of the fifth nerve at the foramina rotundum and ovale simultaneously by the temporal method.—*Arch. f. klin. Chirg.*, Bd. XLVIII, p. 13.

GEORGE RYERSON FOWLER (Brooklyn).

## CHEST AND ABDOMEN.

**I. Pneumothorax from Fracture of the Clavicle.** By Dr. DECES (Rouen, France). Deces records the case of a man, thirty years of age, who, jumping from a run-away carriage, received a fracture of the right clavicle, near the middle portion, with no broken ribs or emphysema. On examination of the thorax on the right side, increased resonance and a very distinct amphoric souffle were found. An empyema developed, and a pint of reddish, partly purulent fluid was evacuated. The pneumothorax was either developed from contusion of the lung or from the broken clavicle impinging upon it. The consequent effusion then underwent suppuration. This is stated to be a very rare complication of fracture of the clavicle, although it is mentioned in the literature.—*La Tribune Medicale*, No. 4, 1893.

**II. Operative Treatment of Purulent Pleuritis.** By Prof. J. W. RUNEBERG (Helsingfors, Finland). Radical operation for empyema has been performed by Runeberg 105 times in fourteen years (1876–1890) at his surgical clinic in Helsingfors. In fifteen cases there were other grave complications, as pulmonary gangrene, advanced tuberculosis, extensive amyloid degeneration of various organs, or heart diseases. He divides his cases into groups, according as they were treated. The first group comprises twenty uncomplicated cases, treated from 1876 to 1883, partly with and partly without primary resection of a rib, but with daily pleural irrigation. Of these patients, six (30 per cent.) recovered completely; in nine (45 per cent.), a fistula persisted and five (25 per cent.) died. These results cannot be called encouraging; possibly the irrigation daily was the cause of the large number of fistulae and the high mortality. The second group, nine patients, has to do with those where, after primary costal resection, only one irrigation was done, and that immediately after the operation. Out of these, seven recovered wholly (78 per cent.); two were discharged with a fistula, but none died. The average time under treatment was eighty-eight days; under the previous

method it was 111 days. Since 1887 he has even avoided this single irrigation, on account of the difficulty of performing it thoroughly, and of its fatiguing the patient. The results were highly satisfactory. Of fifty-eight patients thus treated, fifty-six (96.5 per cent.) recovered; one had a fistulæ and another died from erysipelas. Average time, fifty-two days. Chloroform anæsthesia in most cases was used, though, in some, where it was considered dangerous to anæsthetize, two injections of cocaine were given and a little chloroform was allowed to be inhaled. In these cases, pain was only felt on separating the periosteum from the inner side of the bone. Out of fifty-three patients, the average duration was forty-seven days. Thirty-six were of the male sex, with an average duration, till a complete recovery, of forty-three days; the seventeen females presented an average of fifty-four days. In twenty-six cases the exudate was right-sided, of which the average time was forty-three days; the twenty-seven left-sided ones had an average of fifty-one days. The age of the patient had no influence upon the duration of the case; sixteen patients, between nine and nineteen years, presented an average of forty-one days; nineteen patients, from twenty to thirty years, also forty-eight days, and thirteen over thirty years, an average of forty-five days. The previous duration of the disease has no influence upon the course of the case; in twenty-seven cases, where an operation was done within two months after the beginning of the disease, the average time till recovery was fifty days, while in twenty-four cases of a longer duration it was only forty-three days; in two cases the previous history could not be ascertained. In eleven cases the empyema was over six months' duration, and these had an average of forty days. If anything, the older the empyema the shorter the average time. On the contrary, deformities of the thorax are more frequent than in those operated on earlier. Communication with the bronchi, or the spontaneous formation of an external fistula, has also no influence upon the average duration. In twelve cases, with communication with the bronchi, the average time was forty days; in seven cases, with external fistula, forty-two days. The amount of the exudate seems to

influence the length of time of the disease. The longest under treatment are those in which the exudate filled the entire pleural cavity and displaced the heart and diaphragm, with a consequent average of fifty-six days. The shortest average are those with a moderate sized exudate, not the smallest sized. The only danger is the anaesthesia during the operation. In order to reduce the time still more, he advises removing the drainage tube as soon as the discharge has greatly decreased. In case the exudate be gangrenous, he recommends cauterizing the wound with the thermo-cautery to prevent infection of the wound, and to perforate the pleura with this instrument, or to operate, at two times, with an interval of a few days.—*Hospitals-Tidende*, No. 45, 1892.

**III. Washing out the Stomach in Acute Internal Incarcerations.** By Dr. S. POLLAK (Budapest). The writer employed irrigation of the stomach in severe cases of incarceration; five of these recovered and two died, though in these two the intestine was rendered permeable. He fixes the indications as follows:

(1) Washing out of the stomach is indicated in occlusion from coprostasis, enteroliths, gall stones and foreign bodies, if the latter be not of too large a size. It is also of service in obstruction from kinking and axial twisting of the intestine, as well as in incarceration from pseudo-membranes and in the so-called "pseudo-incarceration." In general, it is to be tried when the localization of the stenosis is impossible and the cause is more or less definitely to be determined. If an operation is decided upon it should precede.

(2) This procedure *must be done* in those cases where the time favorable for operation has passed or an operative interference is impossible or cannot be secured. Here it acts as a palliative.

(3) Before an operation it acts favorably by decreasing intra-abdominal pressure. Irrigation should be done for two, three or four days, two or four times a day. If then the intestine remains impermeable an operation must be done. The writer employed Ewald's gastric tube; no preliminary cocainization was necessary. Before

introduction of the tube an injection of camphor may well be given. Pure lukewarm water was used until it returned unpolluted.—*Orvosi Hetilap*, Nos. 50, 51, 53, 1892.

**IV. A Case of Peritoneal Tuberculosis Successfully Treated by Laparotomy.** By Dr. PONCET (Lyons, France). The writer records a case of miliary tuberculosis of the peritonæum which was successfully treated by laparotomy. The patient, a young girl of nine years, was received at the hospital in a most deplorable condition: unable to stand unassisted, the abdomen sensitive to pressure, and distended: she was dyspnœic, answered questions badly and, in short, she was nearly dead. July 19, 1892, laparotomy was performed, and three-fourths of a litre of fluid removed. The parietal layer of the peritonæum, intestines and mesentery were disseminated with nodules varying in size from that of a pea to a pin-head; the ascitic fluid contained tubercle bacilli. Three to four grams of iodoform were dusted over the intestines and the abdomen closed. In four weeks the child was able to leave its bed, and in September she returned to the country to follow her occupation of tending sheep. At present, five months after the operation, the child is scarcely to be recognized; it looks well and hearty, has no pains, and its appetite and sleep are excellent. Her abdomen is still somewhat enlarged, but not painful, while there is no ascites nor dulness on percussion.—*Le Bulletin*, No. 2, 1893.

F. H. PRITCHARD (Norwalk, Ohio).

**V. The Radical Cure of Crural Hernia.** By Dr. BERGER (Paris). It is fortunate that crural herniæ are less frequently observed than the inguinal variety, for the reason that not only are greater difficulties prevented in adapting proper truss support and preventing strangulation, but radical operative procedures are less successful than those designed to cure the latter. Crural herniæ are frequently but

partially reduced, and it is, therefore, no uncommon circumstance to find extensive adhesions between the sac-wall and its contents. Anything, therefore, which improves the technique, and at the same time increases the chances of permanent cure, should be welcomed. The suggestions of Berger are worthy of consideration and trial. After the usual ligation and excision of the sac he leads the ends of the ligature above the hernial canal and through the abdominal wall from within outward, where they are tied. By this device the otherwise funnel-shaped depression at the site of the crural ring is reversed, and recurrence prevented. A purse-string suture closes the wound, the pectineal fascia being attached to Poupart's ligament.—*Bull. et mém. de la soc. de chir. de Paris*, Vol. XVIII, p. 345.

**VI. A Modification of Bassini's Operation for the Cure of Inguinal Hernia.** By Dr. R. FRANK. The author's proposed modification of Bassini's operation consists in the following: Basing his suggestions upon the fact that recurrences, when they occur, present themselves as a direct hernia, corresponding to the external abdominal ring, he designs to sink the cord from this point into a groove cut in the anterior surface of the pubic bone, instead of permitting it to remain in the subcutaneous cellular tissue. The periosteum is first loosened from the bony surface, and after the groove is cut, and before placing the cord therein, the groove is lined by the loosened periosteum. The muscular structures are sutured above the groove, no defect being left in the soft parts to encourage a hernial descent.

Bassini has twice employed the above procedure, each time with excellent results, as claimed.—*Wiener med. Wochenschrift*, No. 29, 1892.

**VII. The Treatment of Gangrenous Hernia.** By Dr. BUTZ. Butz, after a careful study of the literature of the subject, including 204 cases in which a preternatural anus was established, and 219 with primary resection of the gut, reaches the following con-

clusions: In case of gangrene, the constricting band is to be incised from without, the loop of intestine grasped above the constriction, resection performed in healthy tissue, and both open ends sutured to the skin. The artificial anus thus formed is to be subsequently removed by the comparatively dangerless method of Dupuytren, Bruns or Macewen; secondary resection is only to be resorted to as a last refuge. It may be advantageously replaced, in some instances, by lateral anastomosis. Primary resection and immediate union of the bowel ends, when ventured upon, should be accompanied by a most careful disinfection of the hernial sac. The canal must be freely opened, and the loop drawn well forward, particularly the efferent portion; the bowel-loop must be thoroughly emptied, and the resection must be made in healthy tissue. Reposition being effected, the hernial opening is left open. Peritonitis does not contra-indicate the operation. In the absence of collapse, or the same being but moderate, this procedure may be resorted to. Czerny's or Woelfler's double row of sutures are quite as reliable and less complicated than Hahn's and Helfrich's methods. The methods of suturing called the "American" (Senn, Robinson, Ashton, Baldy), are mentioned as being particularly practical.—*Chirurgischesky Vestnik*, 1892.

**VIII. The Anatomy of the Cæcum and Vermiform Appendix, and Its Relation to Appendicitis.** By I. TURNER. Turner has made a careful study of the regional anatomy of the cæcum and vermiform appendix upon the cæcum, with the following results:

In 83 instances in which the appendix lay freely in the abdominal cavity its position was as follows:

In 51 it hung down into the lesser pelvis.

In 20 it passed transversely over the psoas toward the sacral promontory.

In 6 it lay freely on the iliacus or psoas.

In 2 it passed upward along the lateral surface of the ascending colon.



In 3 it lay in the meso-gastric region, the commencement of the colon being located transversely.

In 1 it lay in front of the sigmoid flexure, upon the right side.

In 22 cases in which the appendix lay behind the first portion of the colon, between this and the posterior abdominal wall, its relative position was as follows :

In 4 it lay curled up behind the ileo-cæcal junction.

In 5 it lay directly behind the cæcum.

In 6 it passed *intra-peritoneally* along the posterior or postero-medial surface of the colon.

In 2 it passed in the same direction *extra-peritoneally*.

In 4 it passed in the same direction, but partly *extra-peritoneally*.

In 1 the fundus of the cæcum turned upward and backward, the appendix lying behind it.

After discussing the influence which these varieties of location have upon the clinical course of appendicitis he draws the following conclusions :

(1) The cæcum is the initial portion of the colon, and is always covered by peritonæum, posteriorly as well as anteriorly. (2) The vermiform appendix corresponds to the cæcum of animals from the point of view of the comparative anatomist, but has no physiological importance in man, undergoing, in the course of its growth, several changes, the results of which are apparent late in life. The anomalies of its location can be explained upon embryological grounds. An especially frequent anomaly is the location behind the cæcum. (3) Inflammatory processes in the region of the cæcum originate almost exclusively from the appendix. The higher mortality in childhood and young adult life is due to the fact that the communication with the cæcum is wider. The valve of Gerlach, if in existence at all, takes a very small part in the closure of the lumen at its point of attachment. (4) So-called "perityphlitis" is a circumscribed peritonitis originating from the appendix. The resulting abscess cavity from appendicitis lies intraperitoneally. (5) "Paratyphlitis" is to be considered as a complication in the shape of a phlegmonous

inflammation arising from an appendicitis, in which a perforation of the appendix takes place in those instances in which the latter lies behind the cæcum and extraperitoneally. Here, likewise, the cæcum itself takes no part etiologically. (6) Circumscribed suppurations in the occasionally existing pouches of peritonæum behind the cæcum may simulate a paratyphlitis, but do not show any tendency to spread in the connective tissue from the beginning. On the other hand, many of the suppurative processes in the cellular tissue of the lumbar region, such as subphrenic and paranephritic abscesses, etc., may be traced to affections of the appendix. (6) In the diagnosis of appendicitis an examination of the lumbar region, as well as of the rectum, is indispensable. (7) Exploratory puncture is not only dangerous in itself, but may lead to error.—*Chirurgitschesky Vestnik*, 1892, March and May.

GEORGE RYERSON FOWLER (Brooklyn).

### IX. False Renal Ballottement in Subhepatic Tumors.

Dr. LE DENTU (Paris). The writer has recently observed four cases where renal ballottement was most distinctly present and due to the presence of a subhepatic tumor. The first patient presented a tumor (subhepatic) which was to be diagnosticated with difficulty, and where renal ballottement was pronounced. Operation revealed an enlarged gall bladder, filled with numerous calculi, and the whole masked by a mass of omentum. In the second case there was a clear ballottement of the tumor which, however, followed the movements of the diaphragm. It turned out to be simply a portion of the omentum. A third case had a badly defined tumor below the liver and in the region of the gall bladder, which also was accompanied by ballottement. Laparotomy revealed the presence of a gall bladder, filled with calculi and surrounded by adherent omentum, which constituted the bulk of the tumor. Finally, he operated on a fourth case where a gall bladder alone gave rise to renal ballottement. These cases go to demonstrate that renal ballottement has not all the pathognomonic

value which has been attributed it, for subhepatic tumors may also produce this same sensation. Dr. Reclus also reported a case where a patient, with all the signs of appendicitis, presented this same sign. An operation showed the presence of an appendix which was greatly curved backward and perforated at its terminal extremity, thus leading to the development of a tumor, especially anterior to the kidney.—*La Semaine Medicale*, No. 9, 1893.

F. H. PRITCHARD (Norwalk, Ohio).

### EXTREMITIES.

**Bloodless Amputation at the Hip Joint by a New Method.** By N. SENN, M.D. (Chicago). The following conclusions represent the principal advantages of the bloodless amputation at the hip joint as described by the author.

1. Preliminary dislocation of the head of the femur and clearing the shaft of this bone of all soft tissues down to the proposed line of amputation through an external straight incision requires less time, is attended by less hæmorrhage and shock than when this part of the operation is done after circular amputation, as advised by von Esmarch and others.

2. The external straight incision is the same as von Langenbeck's incision for resection of the hip joint, differing only in length.

3. After dislocation of the femur, the soft tissues are tunneled with a hæmostatic forceps, which is entered through the external wound on a level with the trochanter minor to a point on the inner aspect of the thigh, behind the abductor muscles, and about two inches below the ramus of the ischium, where a counter opening, two inches in length, is made.

4. Bloodless condition of the limb should be secured by elastic compression or vertical position prior to tying the elastic constrictors.

5. An elastic tube, three-quarters of an inch in diameter and about four feet in length, is grasped with the forceps in the centre and drawn through the tunnel made by the forceps.

6. After dividing the elastic tube in the centre, the base of the thigh is constricted by drawing firmly and tying the anterior constrictor in front of the anterior section, while the posterior constrictor, after being drawn tight behind the posterior section, the two ends are crossed and then made to encircle the whole thigh, when the ends are again drawn firm and tied or otherwise secured above the anterior constrictor.

7. A long and a short oval cutaneous flap should invariably be made in all amputations at the hip joint.

8. In preference, a long anterior and a short posterior flap should be selected.

9. The transverse section through the muscles should be somewhat conical in shape, the apex of the cone corresponding to the tunnel made by enucleation of the upper portion of the shaft of the femur.

10. Resection of the end of the sciatic nerve and ligation of all vessels that can be found should be done before the removal of the constrictors.

11. The femoral arteries should be secured by a double catgut ligature, half an inch apart, the one on the proximal side including also the accompanying vein.

12. The posterior constrictor should be removed first, and all hæmorrhage arrested by ligation and compression before the anterior constrictor is removed.

13. The upper part of the wound corresponding to the acetabulum should be drained with an iodoform gauze tampon, and the remaining part of the wound by one or more tubular drains.—*Chicago Clinical Review*, February, 1893.

## BONES, JOINTS, ORTHOPÆDIC.

### I. Treatment of Fracture of the Patella by Massage.

By Dr. P. KLEMM (Riga, Russia). The writer describes a procedure which, for the last five years, has been used with satisfaction in the surgical department of the city hospital of that city. Immediately

after the entrance of the patient, his knee and the surrounding portions of the limb are moderately massaged, especial care being taken to rub from the centre of the fracture centrifugally, in order to assist the lymphatic and venous currents in removing the extravasation. The joint is then wrapped in cotton batting and a figure-of-eight of surgeon's plaster applied, so that a moderate pressure be exerted upon the intra-articular exudate, and the fragment be held in coaptation. A splint is then applied and the limb somewhat elevated. In two or three days this is removed and massage again tried, the femoral muscles being especially manipulated. From then on the articulation is massaged daily. In two weeks slight passive movements are made, and the patient instructed to elevate the extremity with the knee held in extension. In the majority of the cases, the patient was able to walk about the room, between the third and fourth week, with the aid of a cane, and from the end of the fifth week to the beginning of the sixth week he was in condition to be discharged. In no case was osseous union obtained, yet a strong fibrous bridge was found to have formed between the fragments, which did not interfere with the action of the joint. In all cases complete active extension, with flexion to fifty degrees, was obtained, which will, doubtlessly, increase with the further use of the articulation. In no case was atrophy of the quadriceps, cicatricial processes in the neighborhood of, nor in the joint, observed. The writer warns against generalization of the use of the bloody suture, and recommends his method. The advantage is that it may be carried out by any one with a little skill, patience and care. —*Medizinische Neuigkeiten*, No. 2, 1893.

**II. Hoffa's Operation in Congenital Dislocation of the Hip.** By Dr. DENUCE (Paris). The writer operated on a young girl of five years, with the usual signs of congenital dislocation of the hip. The left lower extremity was short five and one-half centimeters, and slight lordosis and scoliosis were present. An incision was made parallel with the greater trochanter, the greatly thickened capsule exposed and opened longitudinally. The head of the femur was found

to be atrophic, the round ligament absent, and the neck of the femur abnormally short. As a reduction by traction was found impossible, the trochanteric muscles were severed at their attachments. The glenoid cavity, filled with fibrous tissue, was chiseled out and the femoral head replaced in its cavity. Seven weeks after the operation the child could stand; fourteen weeks later walk with aid of crutches; a year after the lordosis had disappeared, the scoliosis decreased, and though the head was in its normal position, there remained a shortening of three centimeters.—*Trans. of Paris Surgical Society*, Session of January 4, 1893.

F. H. PRITCHARD (Norwalk, Ohio).

**IV. Osteoplastic Necrotomy.** By Dr. BIER. A procedure designed to expose an involucrum and remove its contained sequestrum, without removing any of the healthy bone, is designated by the above title by Bier. It is most frequently applicable to diseased conditions of the tibia, although it has been employed in other regions. Bier states, however, that it is not a useful operation in the case of the femur. In the case of the tibia the technique is as follows: Points above and below the site of the sequestrum are selected and transverse incisions made, including soft tissues and periosteum. A longitudinal incision, uniting either the outer or inner extremities of these, is made, avoiding in its course any fistulous openings present. This longitudinal incision may pass with advantage along the middle of the inner surface of the bone. The incision through the periosteum at the sites of the transverse incisions should include rather more than half the width of the anterior surface of the bone. The soft parts are retracted, and by means of a metacarpal saw the bone is sawn about half way through at the upper and lower transverse incisions. Along the line of the longitudinal incision a broad chisel is applied, and by means of strong blows with a heavy mallet the cortical substance is divided, and the section of the tibia separated and pried up by means of the chisel or an elevator. The soft parts

attached to the bone remain intact, and the anterior half of the tibia, in the shape of a bony flap, is raised like the lid of a chest, turning back upon the periosteum and superadjacent structures as a hinge, the cavity containing the sequestrum, representing the cavity of the chest, which is fully exposed to view. The sequestrum is removed, all granulation tissue thoroughly scraped away, including the sinuses, the parts thoroughly disinfected, and the "lid," or bony flap, replaced and sutured. The cavity is permitted to fill with blood clot. If hæmorrhage is excessive, the parts are tamponed, and secondary sutures employed subsequently. Attempts to fill the cavity with Senn's decalcified bone were not successful.

Thirteen operations of this character have been performed by Bier. Moderate suppuration was observed in most of the cases, although final healing was obtained. From two to three months was occupied, however, but this is no longer than the time required in an ordinary necrotomy.

The advantages claimed are: (1) It is a physiological and conservative operation; (2) it avoids an unsightly depressed and attached cicatrix; (4) it permits accurate inspection of the diseased parts, as well as the most radical necrotomy; (5) the time required for healing is no longer than that necessary after other procedures.—*Archiv. f. klin. Chirg.*, Bd. XLIII, p. 121.

**V. Bone Suture Without Drilling.** By Dr. J. DOLLINGER (1893). In cases of pseudarthrosis following fracture, Dollinger adopted this procedure on account of the difficulty of drilling the preternaturally hard bone. Two pieces of stout silver wire were made to surround the shaft of the bone, the one above and the other below the site of the fracture, in a ring fashion. Two other wires, passed beneath these and upon each side of the bone, parallel with its longitudinal axis, connect the wire ring surrounding the upper fragment with that surrounding the lower fragment. Twisting of the ends of each longitudinally placed wire, after passing beneath the wire rings, gradually draws together the fragments until complete approximation is obtained.

The two cases in which the method was employed united perfectly. It is applicable both in ununited fracture and in cases in which difficulty is experienced in maintaining fragments in position, as well as where an ordinarily applied bone suture would cut out.—*Centralblatt für Chirurgie*. 1933, No. 2.

GEORGE RYERSON FOWLER (Brooklyn).

## GYNÆCOLOGICAL.

**I. Fixation of the Uterus to the Periosteum of the Symphysis Pubis.** By Dr. H. KUEMMEL (Hamburg). Kuemmel substitutes suturing of the retroflexed or prolapsed uterus to the periosteum of the symphysis for suturing to the movable abdominal wall. Three sutures are required, the central or main one taking a deep and broad hold upon the fundus uteri, and attaching it by an equally broad hold to the symphyseal periosteum, the lateral sutures supporting the fixation. Care should be taken not to break off the needles against the bone. Kuemmel claims that the fixation is more permanent, and that the mobility is as great as in the other methods.

Three cases of retroflexion and three of prolapse were treated in this manner. One of the first group is interesting from the fact that the patient was delivered at term a year and a half afterward. The labor was normal, save a premature escape of liquor amnii. Examination six weeks after the delivery showed the uterus to be solidly adherent to the symphysis. The other five cases were found not to have relapsed, when examined at periods varying from one and a half to two years after the operation.—*Deutsche Med. Zeitung*, 1892, No. 49.

**II. Total Extirpation of the Uterus for Large Fibromata and Fibrocystomata.** By Dr. PÉAN (Paris). The former method, pursued by Péan, consisted in opening the abdominal cavity, separating, between forceps, the broad ligaments, passing a wire ligature about the neck below the tumor, and removing the uterus and tumor. The anterior and posterior vaginal fornices were then opened,



the lower portion of the broad ligament secured by clamps, and the uterine stump removed. The clamps placed upon the broad ligaments were left in site for one or two days, at the end of which time all danger of hæmorrhage will have ceased.

More recently this procedure has been somewhat modified by Péan. Upon lifting the tumor from the abdominal opening, a round rubber tourniquet is applied about the deepest joint available, after which the organ is extirpated some distance beyond the ligature. The bladder and rectum, if these are adherent, are now separated from the stump, and the metal ligature or wire loop applied below the rubber ligature. After the removal of the rubber tourniquet, the ends of the silver wire are led into the vagina. The abdominal cavity is now closed. The stump and silver wire come away through the vagina.

As a result of his experience with this operation, Péan claims that such a combined abdominal and vaginal procedure possesses decided advantages over formerly employed methods.—*Annales de Gynécologie*, July, 1892.

**III. Vaginal Hysterectomy, with Median Section of the Uterus in Pelvic Suppurations.** By Dr. E. QUÉNU (Paris). Péan's proposition to perform total vaginal extirpation of the uterus by morcellement in this class of cases can be replaced by the method of Quénu with advantage, who found it to be more practicable, in case the uterus is yet mobile, to split the uterus in two symmetrical portions, and then extirpate. The technique is rather simple. The vaginal mucous membrane is loosened in a circular manner, in the usual manner, and the anterior and posterior fornices opened. The uterus is drawn down, two clamp forceps being placed laterally, as much as possible, and split in a vertical direction up to the fundus. Its mucous membrane is then cauterized by means of a 10 per cent. zinc chloride solution. The section being then extended through the fundus, the two halves are grasped by means of hooked forceps and by torsion movements, and excised. The peritoneal surface of the posterior Douglas cul-de-sac is sutured to the vaginal mucous membrane

(Martin's method). Quénu ligated preliminarily in some instances the broad ligaments.

According to Jaffé this operative procedure was introduced by P. Mueller ten years ago for uterine carcinoma (in *Centralblatt f. Chirg.*, No. 16, 1882, and No. 20, 1884).—*Centralblatt f. Chirg.*, No. 42, 1892, and *Annales de Gynécologie*, May, 1891.

GEORGE REYERSON FOWLER (Brooklyn).

**IV. A Rare Form of Double Pyosalpinx.** By A. C. BUTLER-SMYTHE, F.R.C.S., Edin. (London). A woman, aged twenty-six years, married five years, during which time coitus had always been painful, with a history of abdominal inflammation seven years ago, had felt pain and swelling for four months in the lower abdominal region. Examination revealed a large, elongated swelling, centrally situated and rising to the umbilicus, freely movable, but not tender to the touch, and its lower part occupying Douglas' pouch. On the left side another large swelling could be detected, filling the pelvis on that side. With a diagnosis of "two tumors of somewhat doubtful nature, the central one probably ovarian and that on the left side a distended Fallopian tube," abdominal section was undertaken. This revealed a mass of dense adhesions enclosing what appeared to be four tumors, which were resolved into the uterus, the cerebral tumor—which was found to be the greatly distended right Fallopian tube—and the left Fallopian tube enormously distended. After removing both tubes intact with great difficulty, the abdomen was duly closed. The contents of both consisted of creamy pus, without the slightest evidence of fœtus. The author remarks upon the desirability of removing the tumors intact in these cases, tapping causing them to collapse, thus removing the landmarks and increasing the difficulty of operation.—London *Lancet*, January, 14, 1893.

#### **V. Laparotomy in Patients Over Seventy Years Old.**

By J. RUTHERFORD MORRISON, F.R.C.S. (Newcastle-on-Tyne). The author reports five cases:

(1) A widow, aged seventy, presented an abdomen with the distension of a six months' pregnancy, due to an elastic fixed tumor pushing the tumor over to the right. A broad ligament cyst was exposed, tapped and enucleated after dividing the peritonæum covering it, the operation lasting one hour. Drainage was employed for three days, the patient was allowed to get up in ten days, was discharged cured in a fortnight, and still remains well.

(2) A widow, aged seventy-four, presented a large, well-defined tumor distending the abdomen rather more than a full-term pregnancy. Abdominal section permitted the removal of a large, cystic, ovarian tumor, free from adhesions. The wound healed by first intention, and the patient achieved a permanent cure on the fifteenth day.

(3) A widow, aged seventy-two, had observed an abdominal tumor for some seventeen months. Laparotomy allowed the extirpation of a flaccid cyst of the right ovary containing about a gallon of very thick, glairy fluid; the left ovary, with a hard tumor about the size of a walnut, was also removed, and the abdominal wound entirely closed. The wound healed practically by first intention, the patient got up on the tenth day and went home permanently cured on the fifteenth.

(4) A widow, aged seventy-seven, had for years presented a large abdomen, and thirty-three or thirty-four years previously had suffered from "inflammation of the bowels." Abdominal section permitted the removal of an ovarian tumor the size of a foot-ball. A second incision above the centre of the crest of the ilium opened an abscess from which escaped fully six ounces of fetid pus. The ovariectomy wound healed without complication. But on the twenty-second day a gush of pus occurred from the abscess wound; this recurring several times, a new incision was made thirteen days later, evacuating four ounces of pus and giving so great relief that the patient was soon able to be out of bed. Ten days later pus was again found at the first incision, and the two incisions were connected by drainage tubes and free irrigation established, but the patient never really rallied.

and died on the fifty-ninth day. This would properly be considered a successful laparotomy, the patient dying from the abscess, which the autopsy showed to have been due to appendicitis.

(5) A woman, aged seventy, presented a tumor, which abdominal section showed to be a retro-peritoneal malignant mass surrounding and involving the cæcum, which later microscopical examination showed to be a cylindroma. A pointing swelling in the right iliac cavity was noticed, and incision produced pus. The median wound was now closed and the iliac abscess drained. Free suppuration followed, but the patient's general condition was bad, and her heart, already hypertrophied from mitral stenosis, gave out on the seventy-fourth day after the operation.

In resumé, four of the cases suffered successful ovariectomy, three of which continued well and the fourth died nearly two months later from appendicitis; the fifth recovered from an exploratory laparotomy, but died nearly three months later from an abscess of the abdominal wall and a feeble heart.—London *Lancet*, January 21, 1883.

JAMES E. PILCHER (U. S. Army).

## REVIEWS OF BOOKS.

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HANDBOOK OF INSANITY FOR PRACTITIONERS AND STUDENTS. By Dr. THEODORE KIRCHHOFF, Physician to the Schleswig Insane Asylum, and Privat Dozent at the University of Kiel. Illustrated with eleven plates. New York: William Wood & Co. 1893.

This is a translation of a recently published German text-book of considerable merit, one that has already been favorably received in its own country. It belongs to the class of condensed manuals, giving in a lesser space the main facts that are given more in detail in the larger works. Hence, it is of value, especially as a manual for the general practitioner, though, as an original work of merit, it ought also not to be left out of the library of the specialist.

The section on insanity in general, its nature, mechanism, symptoms, etc., takes up a little more than half the book, a rather larger proportion of space than is given to it in many of the text-books. It also seems to us to be the most satisfactory portion of the book. There is no attempt to give any detailed account of the mechanism and physiology of the brain, but a few leading points are clearly stated. Nor, on the other hand, does the author indulge in the more or less elaborate psychological discussions that are met with in some German text-books; he treats the subjects in a direct, common-sense way, and without any obscurity or complexity.

• The special part of the work is not quite so satisfactory, though still very good in its way. There is a good deal said at the present time in disparagement of attempts at the classification of insanity, and yet a satisfactory division and arrangement of the various forms is, in a work of this kind, a matter of some importance. A perfect or a natural classification is admittedly impracticable, but some systems are better as working arrangements than others, and the

author has not made his best success in this regard. He, indeed, acknowledges his possible defects, and only claims to attempt to furnish a rapid survey of the essentially different clinical forms of insanity.

As regards special points in this section, the author's division of paranoia into three forms, *wahnsinn*, *verrücktheit* and confusion is original, and may not receive general acceptance. The translator has not attempted to give English equivalents of these terms *wahnsinn* and *verrücktheit*, but it appears that by the first of these is indicated delusional insanity with pronounced emotional disturbances; by the second, the ordinary type of systematized paranoia without pronounced affective phenomena.

The subject of paretic, or paralytic, dementia, is treated as usual more at length than are the other species of insanity. Dr. Kirchhoff considers syphilis as a prominent predisposing cause, but does not commit himself to what is probably the coming belief, that this species of mental disorder is always preceded by specific disease. He says: "When severe symptoms of syphilis are still present, the signs of dementia paralytica are not typical." Since paresis, so far as it is due to syphilis, is usually a late development, it would not be expected, as a rule, to exhibit its characteristics while the specific symptoms are still observable, but it is not invariably the case that it does not.

Another point that is perhaps worthy of note here, is that no mention is made anywhere of any surgical treatment of epilepsy or of other forms in which it has of late been recommended, such as congenital mental defect with cranial malformations. In this the author is probably in accordance with most conservative alienists of large experience.

The translation is very fairly done into good English, with the exception of a certain slovenliness in the retention of some German idioms, for which English words are available. The illustrations of the different types of insanity are striking, and some of them quite characteristic.

H. M. BANNISTER.

HISTORY OF THE LIFE OF D. HAYES AGNEW, M.D., LL.D. By J. HOWE ADAMS, M.D. With fourteen full-page portraits and other illustrations. In one large royal octavo volume, 376 pages, extra cloth, beveled edges. Philadelphia: The F. A. Davis Co., Publishers, 1914 and 1916 Cherry Street.

The professional life of D. Hayes Agnew began in 1838, eight years before the discovery of surgical anaesthesia, and terminated in 1892, covering a period of fifty-four years, a period during which surgery was recreated. He was the product of times and conditions that were peculiar, and have now passed away. In a pre-eminent degree he was a representative of the best type of the indigenous American surgeon, and any adequate record of his career cannot be otherwise than of great interest to any student of the conditions of American life during the last three-quarters of the nineteenth century, while to those who knew him personally, and especially to the thousands who were his pupils, such a record is of the greatest value.

The work of Dr. Adams is well done, and gives a charming and clear view of the career of the great surgeon. Agnew's personal character was that which made him supreme; others have been as industrious, some have been more prolific as authors, many have been more suggestive and original as investigators; as a counselor and operator, while wise and skillful, he still had his peers; as a lecturer and administrator he was good, but yet not beyond the level attained by many of his contemporaries. It was not his superiority in any one thing that made him tower above his fellows in the later years of his life, but the equal balance of all the qualities which go to make up a leader among men. Naturally, therefore, his pre-eminent influence was of slow growth; he had attained the age of fifty-three years, and had been in practice more than thirty years, when he was made professor of surgery in the medical department of the University of Pennsylvania. It is the testimony of his colleagues that he grew and developed as a teacher and practitioner steadily, year by year, for the twenty years that followed this period, all during which he filled and adorned his professorial chair. Then began the chief

literary work of his life, his systematic treatise on the "Principles and Practice of Surgery," the first volume of which was published in 1878 and the last in 1883, when he was already sixty-five years of age.

The book before us most admirably traces all the steps of the life progress of its subject. The first chapter, devoted to the lineage of the Agnew family, is an interesting exhibit of the manner in which the best American blood has been brewed, and illustrates, as well, the tendency to fail of many families after they have attained their highest fruitage. The great-grandfather of Hayes Agnew had nine children; his son, the grandfather of Hayes, had twelve children; his son, the father of Hayes, had but one, while no child remains to emulate the career of Hayes himself.

The early life, the business life, the launching of his career in Philadelphia, his work at the head of the School of Anatomy, as professor of surgery, as a writer, at home, each of these phases of Agnew's life are delineated in as many chapters, while incidentally the whole history of medical instruction in Philadelphia during the period comprised in his life is quite fully described, together with many interesting references to his colleagues during this period. The book is illustrated with many portraits, presenting Agnew as he appeared at various years, and adding much to the interest and value of the book. The author has evinced much discrimination in the use of his material, and, with much felicity of style, has preserved a picture of his subject and his life, which, though showing that it has been drawn by the hand of an admirer, still will be acknowledged, by all who knew the man, to be a faithful and just delineation of him.

LEWIS S. PILCHER.



A MANUAL OF THE PRACTICE OF MEDICINE, PREPARED ESPECIALLY FOR STUDENTS. By A. A. SILVINS, A.M., M.D., Instructor of Physical Diagnosis in the University of Pennsylvania, and Demonstrator of Pathology in the Woman's Medical College. Illustrated. W. B. Saunders, Philadelphia, 1893.

This book belongs to the general class of "quiz compends," but in the present instance the subjects include the whole range of the practice of medicine, and fill a volume of some five hundred pages. The idea of the work is fairly expressed in the author's quotation in the preface that "we must snatch, not take," the half of our knowledge, and his hope that it may "serve as an outline of practice of medicine, which shall be enlarged upon by diligent attention upon lectures and critical observation at the bedside." If this statement is meant to imply that it shall be substituted for the larger text-books, it need not, of course, be endorsed; the outlines of the different diseases, as here given, are in very many instances of the briefest description, and the work is simply a condensed general resumé of the practice of medicine, convenient for occasional ready reference, but nothing more. As a student's text-book it is not to be recommended, notwithstanding the apparent intention of the author.

Such works as this are, however, always popular, and this seems as meritorious as any of its class. It includes some accounts of nearly every bodily affection that is now recognized, with brief but reliable statements as to the pathology, symptoms, treatment, etc., of each, brought pretty fully up to the latest results of modern investigations.

H. M. BANNISTER.

MANUEL DE PETITE CHIRURGIE DE A. JAMAIN. Seventh edition. Edited by FELIX TERRIER and M. PÉRAIRE. Paris: Ancienne Librairie Germer Baillière et Cie. Felix Alcan, Editeur. 1893. Pp. 782.

This little manual has been thoroughly revised by the editors, and now is quite up to the present surgical principles. While its

descriptions of instruments, dressings, etc., are minute, they are not diffuse, and to the student, who understands French, this little work must prove most valuable.

Although the revision of the work to suit it to the requirements of modern antiseptic and aseptic surgery has necessitated almost a complete re-writing, the general plan laid down originally by Jamain has been preserved, and the same clearness of statement characterizes this edition that made the former editions so popular.

It is questionable whether space might not have been gained and utilized in some better way than in describing, with the same care and precision that is bestowed on the appliances now in use, methods of working, dressings and apparatus that is declared to be obsolete at the end of the article. It is true that to have omitted these sections would destroy the historical value of the work, but since it has become a standard book, and has passed through so many editions, these sections might be dismissed with a very few words, and the reader could be referred to former editions for more careful descriptions.

SAMUEL LLOYD.

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## THE COMPLICATIONS OF CHOLELITHIASIS.<sup>1</sup>

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AS a result of the incarceration of a stone a number of diseases affecting both the liver and the biliary passages may be produced, which are known by the name of cholangitis, cholecystitis, hepatitis, pericholangitic and pericholecystitic inflammations and neoplasms.

Incarcerated stones generally lie within the biliary passages, and less frequently in a recess connected with the biliary passages due to ulceration. As a result the lumen both before and behind the stone is obliterated or narrowed. If one or more stones are incarcerated in this way, and so situated that the bile passes by them, any of the above diseases may be produced. As a general thing the stone is attached to the wall or, if situated in the recess, is surrounded by a soft mass of cholesterin crystals and epithelium, or pus. In the gall bladder they are encysted near the fundus or at the neck. In the former case the gall bladder is generally normal; in the latter it is atrophied, though sometimes ectatic.

In the cystic duct, and in the common duct, stones are common, and are present in from 4 to 13 per cent. of the cases. In the common duct they are mostly found at the duodenal end. In the hepatic duct they are seldom found ( $\frac{3}{10}$  of 1 per cent. to 1 per cent.). In the intrahepatic passages they are generally found as a soft mass, composed of bilirubin calcium. They are present in about 9 per cent. of the cases. Such a soft mass may be disintegrated when small and washed out by the force of the bile, or they may be so thick as to occlude the lumen. If they remain here they increase in size by the deposit of calcium and cholesterin from the mucous membrane.

<sup>1</sup> Read before the New York Surgical Society, March 22, 1893.

The incarceration of the stone is the primary cause of what is known as irregular cholelithiasis, the essence of which consists in the infectious and ulcerative processes in the biliary passages. If no complication of this nature exists, such a calculus may cause a chronic jaundice or remain perfectly harmless and latent. The latter condition occurs most frequently when the calculus is present in the gall bladder or the cystic duct, provided it is not too large, or infection has not taken place. The same holds good for calculi in the small hepatic ducts. In the common and larger hepatic ducts calculi produce jaundice, though in many instances even here they may remain latent and harmless, if they do not completely occlude the duct. When stones exist in the duct, if the gall bladder be distended it can compress the common duct by its weight. Most frequently, however, chronic jaundice is due to a tumor or a stricture or an abscess, the result of previous calculi. Chronic jaundice depends in all cases upon an interference in the flow of bile. Most frequently the common duct is found dilated in a cylindrical or fusiform manner. This dilatation may be so great that the sac contains a litre of fluid, and such dilatations have been opened for the gall bladder during operations. In such cases the liver appears as a sponge, and upon the surface of the liver varicose dilatations of the biliary passages may be seen. The gall bladder and cystic duct may be dilated as well, but it is more frequently the case that the gall bladder is atrophied when the common duct is obstructed.

Chronic jaundice may also occur without a previous gall stone colic, and in that case is due to stones in the common duct found near the duodenum. When such a jaundice results in a cure it is due to the formation of a fistula between the common duct and duodenum. Death frequently results from this condition, and the patients either die of cholemia, in which coma and hæmorrhages are the common and diagnostic symptoms, or they die of a perforative peritonitis.

The diagnosis of incarcerated stones as a cause of chronic jaundice is always uncertain. The most important symptoms are derived from the previous history of the patient. The persistent want of bile in the feces is in favor of a stricture or a new

growth. The occasional presence of bile in the feces is in favor of stone; so, also, as to the intensity of the icterus. In new-growths it is very rare for the icterus to partially or completely disappear.

The liver is rarely enlarged in gall stones; it is moderately enlarged in new growths involving the common duct. The dilatation of the gall bladder is the common condition in new growths; atrophy of the gall bladder is common in stones. Hypertrophy of the spleen is rare in carcinoma; it is common in stones. Arsis is common with new growths; it is rare in stones. Chills and fever occur more frequently where gall stones are in the common duct than where new growths are present. New growths generally result fatally in one year; such is not the case in stone.

## II. THE INFECTIONS INVOLVING THE BILIARY PASSAGES AND THE LIVER, THE RESULT OF CHOLELITHIASIS.

Of the infections, cholecystitis and abscess of the liver are the more common. Both are due to a cholangitis, and the cause of this cholangitis is the bacterium coli commune. This bacterium causes an exudative inflammation of the biliary passages and hepatitis without suppuration. Where suppuration is present, the pus microbes have always been found. Though the infectious cholangitis obtains its importance from the cholecystitis and abscess of the liver which it produces, it may sometimes of itself cause death, for it is by no means uncommon where calculi exist in the intrahepatic and cystic ducts. It runs its course under the picture of a septic infection, and in many instances, just as in abscess of the liver, the symptoms point only to this infection. Further than this we have no diagnostic symptoms.

(1) Cholecystitis, an infectious disease of the gall bladder, commonly leads to an empyema. This happens when an obstruction to the flow of the bile exists and the secretion from the mucous membrane cannot escape. Under these conditions the contents of the gall bladder consist of a mixture of the secretion of the mucous membrane and of the bile which was pre-

viously present. In the course of a few weeks these are absorbed, and the gall bladder contains a sero-purulent fluid, which, in some instances, is purulent. The amount of pus is generally small and remains so even in a long duration of the disease. The wall of the gall bladder is thickened, œdematous or even phlegmonous. The amount of fluid in the gall bladder is, at times, a litre or a litre and a half. The immediate cause of this inflammation is found in the infection of the bile, due, commonly, to the cholelithiasis, and cases of empyema where cholelithiasis is not the cause are rare.

The occluding stone is most frequently found in the cystic duct, and if not there in the neck of the gall bladder, and less frequently in the common duct. A simple hydrops of the gall bladder results from obstruction in the cystic duct or at the neck of the bladder, if no infection of the bile has taken place, or after such an infection having been exhausted, the contents become free from pus and contain only a large quantity of mucus. The constituents of this secretion consist principally of cholesterin crystals. The mucous membrane of the gall bladder loses its cylindrical character and the epithelium becomes flat. Bacteriological examination reveals the bacterium coli commune in large quantities.

*Symptoms.*—The tumor is behind the anterior abdominal wall, and it can be felt under the border of the liver. Superiorly this border cannot be distinctly appreciated; inferiorly it is found rounded, ovoid or sausage-shaped.

The tumor lies mostly in the para-sternal line on the lateral border of the rectus muscle. Its mobility, superiorly and inferiorly, during the movements of respiration is marked. Lateral mobility is generally present. The tumor can be moved easily upward, but it cannot be replaced as a floating kidney can. In different positions of the body it changes its position quickly and to a marked extent.

During respiration tumors of the gall bladder, by their mobility, can be recognized as distinct from floating kidneys, tumors of the omentum, of the intestines and of the stomach.

The gall bladder tumors descend with inspiration and rise

with every expiration. Tumors of the kidney, of the stomach, of the omentum and of the intestines, descend with inspiration, but if one surrounds the tumor with his hand one is able to prevent its rise during expiration, whereas in gall bladder tumors such is impossible.

In palpating tumors in this region if one places the hand upon the region of the right kidney and the other hand anteriorly upon the tumor, one can distinguish tumors of the kidney quite easily. This is not possible in distension of the gall bladder.

In this examination one must remember that the hand placed posteriorly must be to the inner side of the lateral border of the quadratus lumborum muscle. If one does not pay attention to this, tumors of the liver and gall bladder may be included between the hands.

Inflation of the stomach in cases of tumor of the gall bladder causes it to move to the right, sometimes upward. Tumors of the kidney, on the contrary, disappear by this manipulation. In cases where the intestine lies between the fundus of the gall bladder and the liver, one can render this prominent by inflation of the intestine. The condition of the contents of the tumor may be obtained by puncture, and the result is often important in distinguishing between a hydrops, an empyema and a carcinoma of the liver. If nothing but blood is obtained, a simple empyema and hydrops may be excluded. A negative result of the puncture is also of benefit in the diagnosis of carcinoma of the gall bladder and of the liver. Pure bile, when obtained, is not in favor of cholelithiasis, as it is more frequently found in cases of icterus due to other causes.

To determine whether an empyema or hydrops exists in the gall bladder, the character of the fluid can always be relied upon. In hydrops the fluid is clear and no pus corpuscles can be found; the characteristic epithelium is pavement epithelium. In empyema pus corpuscles are never wanting; they may be colored or not by the bile. In the fluid of an empyema, albumen is always present; in hydrops, mucine is present in large quantities.

We must always remember that puncture of the gall bladder

is not free from danger to the patient, as the wall of the gall bladder is often thin and tensely stretched by its contents, which are often infectious. For this reason no puncture should ever be undertaken unless one is prepared to proceed with the operation.

### III. INFECTIOUS HEPATITIS (ABSCESS OF THE LIVER).

In the livers of those dying from cholelithiasis, suppurative processes are found. Frequently they are unimportant collections in the neighborhood of one or more of the biliary passages. At times, however, the purulent hepatitis increases to such an extent as to form what may be called an abscess. This diagnosis, though important, is rarely made.

The most common causes of abscess of the liver, if we exclude the tropical abscess, are appendicitis, perityphlitis, infection in the radicals of the vena portarum and echinococcus. Yet we cannot pass over cholelithiasis without noting the fact that in some cases small abscesses have been found in great numbers, discreet or connected with one another, and completely riddling the liver, and that in other cases abscesses the size of an apple have been found in the right lobe of the liver connected with the biliary passages, which were filled with pus. The bacteria found here have been the pus microbes. The bacterium coli commune has been found but it is not characteristic, and it has been found also in dysenteric abscesses of the liver.

The abscesses, when found, may be brought about in several ways:

(1) An abscess of the gall bladder may break into the liver, and such cases have been frequently reported.

(2) Purulent cholangitis of the intrahepatic passages may lead to ulceration of the mucous membrane and a pericholangitis. The biliary passages are then filled with desiccated pus, or more frequently with a dark and brittle bilirubin calcium deposit.

(3) Obstruction of the common duct leads to a necrosis of the liver cells and purulent separation of these from the healthy cells.

(4) You may have, also, a pure metastatic abscess when



a stone in the common duct produces a pyelephlebitis and a thrombus, or by producing at once an abscess between the vena portarum and the common duct and subsequently a thrombus in the vein.

The diagnosis of this condition presents a great deal of difficulty, in that the hepatic fever without abscess is often of a remittent or intermittent character, and preceded by a chill. The liver may in such an attack be tender or slightly enlarged, but as it is only in the severer infections where abscess is found, the intensity of the symptoms produced will allow one to decide. The want of enlargement and the want of pain in the liver speak greatly against there being an abscess.

Under these conditions it is always best to wait before making a diagnosis of abscess, for the same symptoms may be due to cholangitis, which when the obstruction to the flow of bile is removed the infection will be exhausted. If this condition does not take place, cholangitis is quite as dangerous as the abscess of the liver.

#### IV. ULCERATIONS OF THE BILIARY PASSAGES.

The changes which take place in the walls of the biliary passages in cholelithiasis have been most clearly studied in the gall bladder. When obstruction occurs in the cystic duct for a long period hypertrophy of the muscular tissue follows. Upon the mucous membrane this hypertrophy appears as thick ridges, exactly as in the urinary bladder. Sooner or later a desquamative catarrh and a thinning of the mucous membrane take place. Finally, ulceration results upon those places which have been pressed upon by the gall stone. This may heal and leave a scar. Ulcerations are most frequently seen in the neck of the gall bladder, in the cystic duct, and at the duodenal end of the common duct, the same situation in which stones are most frequently found.

These ulcers commonly lead to a stricture or a complete closure of the lumen of the duct. The walls of the gall bladder become thickened, undergo a fibrous degeneration, and in some

instances become calcareous. In case the ulcer does not heal, the tissue beyond may become involved. In this manner many infections in the neighborhood of the biliary passages are brought about which result in perforation and the formation of fistulæ.

Sometimes no actual ulceration is present, and the wall of the gall bladder remains practically intact, while the inflammation extends, and, developing a pericolitic abscess, breaks secondarily into the gall bladder or biliary passages.

The results of these processes are manifold, and hæmorrhage from the biliary passages into the stomach or intestine is by no means rare.

(1) In an old and well-marked case of icterus the hæmorrhagic diathesis may develop, or will give rise to bleeding from the stomach and intestines. The danger of this condition has been long seen and appreciated, and greater even is the danger to the patient if, with the appearance of this hæmorrhage, he has previously had the symptoms of cholæmia (delirium, coma). This condition is always fatal.

(2) Cholelithiasis may, by producing an acute thrombosis of the vena porta, cause capillary hæmorrhage from the stomach and intestine.

(3) In rare instances a fistula between the biliary passages and the stomach or intestine gives rise to a great hæmorrhage. In all instances hæmorrhages from this cause have proved fatal.

(4) Cholelithiasis appears to have brought forth hæmorrhage from the biliary passages themselves. These cases, though rare, have in a few instances proved fatal.

(b) *Perforations and the Formation of Fistula.*—Perforations of the wall occur most frequently in the gall bladder; next in the cystic and common ducts. If no adhesions to the neighboring organs exist, and a perforation takes place, the contents of the gall bladder or ducts escape into the peritoneal cavity causing, in most instances, a fatal peritonitis. This is especially the case where the perforation has taken place during an attack of the colic.

In other cases the peritonitis produced is circumscribed, and

there develops an intraperitoneal abscess, which contains pure pus or bile and one or several stones. These abscesses are found most frequently beneath the liver, concealed between it and the stomach and omentum.

When they rise from the gall bladder they generally appear behind the anterior abdominal wall below the border of the liver, or above the convexity of the liver in the sub-diaphragmatic region. The symptoms of these abscesses, except where they occur in empyema of the gall bladder, are very obscure, and their principal interest rests in the production of fistulæ. This formation of a fistula is their most frequent result, for they rarely give rise to rupture and a fatal peritonitis.

Perforation of the gall bladder and biliary passages may open directly into other organs without the formation of abscess, and in this manner are produced the fistulæ which exist between the gall bladder and the colon; the gall bladder and the duodenum and the common duct with the duodenum.

We consider that the fistulæ which exist between the biliary passages themselves have only an anatomical interest for us. Those connecting with the vena portarum are of interest in that they cause an infectious pyelephlebitis, in which the symptoms of thrombosis are wanting.

The retro-peritoneal fistulæ are rare and are derived principally from the gall bladder. Fistulæ between the biliary passages and the urinary bladder are very rare. Courvoisier saw five cases, and in all stones were found. Thoracic fistulæ into the lungs or pleura are derived more frequently from abscess in the liver, suppurating echinococcus cysts or sub-diaphragmatic abscess, due to empyema of the gall bladder.

Fistulæ in the abdominal wall are very common, and almost invariably occur from the gall bladder. When they are formed, if no bile flows, the cystic duct is closed; when bile is present the cystic duct is pervious, or the common duct may be obstructed and all the bile escapes from the fistula. In the latter instance a great loss of bile results in exhaustion to the patient, which is due more to the suppuration in the course of the fistula and tuberculosis which supervenes, than to the loss of the bile

itself, for we must believe that in many instances at least the intestinal digestion is not greatly impaired by the absence of bile. Harley's case, in which the patient lost 270 grammes of bile per day, lived eight years, and died at the age of seventy-four.

(c) *Fistulæ Between the Biliary Passages and the Intestinal Tract.*—These are the most frequent of all fistulæ from the biliary passages. They take place between the liver, the gall bladder, the common duct and portions of the intestinal tract. Most frequently the gall bladder is involved alone. The next in frequency is the common duct.

When a fistula occurs from either of these it may break into any portion of the intestines, and not infrequently into two different portions of the intestines, such as the stomach and duodenum, or the duodenum and colon. When two different portions of the intestines are involved they are generally the duodenum and colon. In point of frequency the gall bladder, more than any other portion of the biliary tract, communicates with the intestinal canal.

The fistulæ between the common duct and the duodenum are interesting from two standpoints. They occur in the simplest manner and the normal condition, after the formation of the fistulæ, exists as before, whereas when the gall bladder and duodenum or colon communicate by the fistulæ they are not so simply formed. The fistulous tract is long and devious, and causes by its existence a constant menace to the patient.

The diagnosis of this condition is often easily made by the passage of a stone per rectum; by the coloring of feces which were before colorless, and by the relief of the jaundice. There are no other diagnostic symptoms.

## V. OBSTRUCTION IN THE INTESTINAL TRACT AS THE RESULT OF GALL STONES.

The closure in the intestines may occur in any part, from the pylorus to the anus.

(1) *Pyloric Stenosis.*—Stones may be present in the gall

bladder, or they may be between the gall bladder and the pylorus in a peri-cystic cavity, which may connect by fistula with the stomach or duodenum, or both. The thickening and cicatricial tissue which involves the pylorus in the wall of the abscess causes a stenosis alone, or is aided by the pressure of the stones within the cavity.

(2) *Gall Stone Ileus*.—Of the larger stones which have entered the intestinal canal, causing stenosis, seven out of thirty-six came from the common duct and twenty-nine from the gall bladder itself. In these cases the greatest danger occurs from the opening into the duodenum of the fistulous tract.

In thirty autopsies twenty-eight stones came from the fistula between the common duct and the duodenum, and in two cases the stone came from the colon. The point of obstruction in this case may be in the small intestine, but most frequently it is seen at the ileo-cæcal valve. It may remain in any portion of the intestine and cause, beside obstruction, ulceration of the mucous membrane, perforation and peritonitis. Cases are reported in which appendicitis and abscess have been caused by the presence of the gall stone.

## VI. DIFFUSE HEPATITIS: CIRRHOSIS OF THE LIVER, DUE TO GALL STONES.

There is little doubt but that cirrhosis of the liver follows cholelithiasis. Virchow, Gubler, Hannot and Charcot have testified in its favor, and yet it is not a frequent occurrence. The calculous cirrhosis has more of an anatomical than a clinical interest, and the cases in which the diagnosis has been made intra-vitam are rare. There are cases which are fatal from the cirrhosis of the liver alone, though in most cases at the time of death the cirrhosis is only slightly marked.

The diagnosis of this condition is only possible where we have the history of a previous cholelithiasis together with an enlargement of the spleen, which is frequently enlarged in cholelithiasis without hepatitis, and must be always thought of in attempting to make the diagnosis.

## VII. MALIGNANT GROWTHS: CANCER OF THE BILIARY PASSAGES.

Malignant disease is not an infrequent complication of cholelithiasis, and the carcinoma occurs as the hard or soft variety; as the alveolar or cauliflower growth. They occur most frequently in the gall bladder, and appear as a thick infiltration of its wall. From this point they extend to the liver, or into the cystic duct, or the hepatic and common ducts, under the form of a continuous growth, or as separate nodules.

In extensive cases the carcinoma will involve the colon, producing a fistula or ileus. They frequently extend to the porta-hepatis and from there into the liver, involving the capsule of Glisson and the intra-hepatic ducts in the vena porta. They cause thrombosis, and as a result ascites.

In the biliary passages themselves cancer is most frequently found toward the duodenal end of the common duct. The next place in point of frequency is the juncture of the cystic and common ducts, and lastly the bifurcation of the hepatic duct. In all these cases they cause an infiltration of the walls and, as a result, compression or a complete obstruction.

The diagnosis of carcinoma in any portion of the biliary tract where cholelithiasis has existed in a case is very difficult. For the carcinoma the important points seem to be first, that there is no history of the cholelithiasis, and the dyspepia, cachexia or the tumor are the first symptoms of the disease. Following these is icterus, which is absent in only 27 per cent. of the cases. The character of the tumor is hard and uneven; it moves with the liver, and is generally in the region of the gall bladder. Nodular metastatic growths are generally present in the liver.

Where the carcinoma exists in the biliary passages the diagnosis is even more difficult. The tumor is generally so small that it cannot be felt, but the complete failure of bile in the intestines is a most important symptom. The jaundice is very marked. When we have a complete failure of bile in the intestines, and a persistent and deep jaundice with a previous history of cholelithiasis, one can say that in about one-half of the cases carcinoma is present.

I have attempted in this paper to show only the complications which may exist in any case in which one decides to operate. It has been my misfortune in surgery to have been placed in the position where the cause of death in operative cases has been only explained by a careful study of the complications existing at the time of operation, which was impossible to diagnosticate before operation. The study of this subject has been carried out with the idea of familiarizing myself with these very points and to obtain, if possible, some light which may be of use to myself and others. On account of the inability to diagnosticate exactly, many of these conditions which I have mentioned I would suggest to surgeons that where death follows any operation upon the gall bladder or biliary passages, an exact and close autopsy be carried out for the purpose of finding which of the above conditions exists, and I would urge surgeons to report as many of the cases as possible, in order that an accurate clinical picture of the diseases following cholelithiasis may be more fully understood.

CASE OF CANCER OF THE HEPATIC FLEXURE OF  
THE COLON PRODUCING INTESTINAL OBSTRUC-  
TION; TEMPORARY RELIEF BY AN ARTIFI-  
CIAL ANUS; LATER RE-ESTABLISH-  
MENT OF THE CONTINUITY OF THE  
BOWEL BY ILEO-COLOSTOMY  
BY MEANS OF MURPHY'S  
BUTTON.<sup>1</sup>

By WILLIAM W. KEEN, M.D.,

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PROFESSOR OF THE PRINCIPLES OF SURGERY AND OF CLINICAL SURGERY  
IN THE JEFFERSON MEDICAL COLLEGE.

MRS. R., of Kansas, was first seen by me with Dr. Ridge and Dr. Lippincott, of Camden, N. J., November 22, 1892.

She gave the following history: She is fifty-three years of age, and had been in very good health up to about sixteen months ago, when she began to suffer from attacks of abdominal pain, referred to the right hypochondrium, which were colicky in nature, frequently repeated and attended with vomiting. She has had no blood in the stools, nor were the feces diminished in calibre. Occasionally, and especially of late, she has had spells of vomiting, but never of fecal character. During this time she has lost forty to fifty pounds in weight, and her general health has become seriously impaired, especially by the recurring and increasingly severe attacks of pain. Examination of the abdomen showed that it was somewhat distended, and that by manipulation the peristalsis was quite marked, especially in the right iliac fossa. Under manipulation there would be suddenly developed in this region a distinct elastic tumor nearly the size of the fist, although more oval in shape, and its development would be attended with great pain, which would be relieved by the audible passage of flatus, apparently through the ileo-caecal valve. No solid tumor was detectable, but the distension, though not

<sup>1</sup> Read before the Philadelphia Academy of Surgery, April 3, 1893.



extreme, was such that the absence of such a tumor was not certain. Her bowels were only moved by artificial means.

The diagnosis was that of obstruction, the cause of which was doubtful, but which, in view of her age and loss of weight and the marked cachexia, was feared to be malignant. A carefully regulated diet, with mild purgation by means of a pill of comp. ext. of colocynth with one gr. of opium every four hours, was decided upon, with additional morphia, if need be, to control the pain.

She was seen again on December 3. The pills had produced only two moderate stools, and had so increased the pain that they had been abandoned by Dr. Ridge in the interval. The pain was now located not in the hypochondrium, but the right iliac fossa. By December 5 the pain, the distension and the exhaustion had become so extreme that it was evident that something must be done immediately for her relief. Accordingly, as soon as her husband's consent could be obtained (he being in Kansas), it was decided to do an exploratory abdominal section.

December 7, Operation. Ether. Section in the middle line showed a small amount of serum free in the peritoneal cavity. The intestines were so much distended that even with the abdomen opened it was impossible at any point to find any lesion, though carefully sought for, especially in the right iliac fossa. Moreover, as the ileum approached the colon it became more congested and more distended. A small incision was made in the ileum, and a large amount of flatus and about two or three pints of liquid feces were evacuated. The opening was closed by Cushing's right-angled suture, and another attempt was made to discover the nature of the evident obstruction. It was then very quickly discovered that there were two or three small masses in the colon just above the ileo-cæcal valve, and another still larger and more firm at the hepatic flexure of the colon. The caput coli was so fixed that it could not be brought into view, but there could be no possible doubt, I thought, of the character of, at least, the mass situated at the hepatic flexure as it was fixed, hard not doughy. As an ileo-colostomy would have required a second incision, and a considerable length of time, it was deemed best to make an artificial anus, as any prolongation of the operation, in the extremely weak condition of the patient, would almost certainly have resulted in speedy death. Accordingly, the portion of the ileum where the incision had been made was brought into the lower angle of the wound (Maydl's operation), but not opened,

and the remainder of the wound was closed with sutures. In order to retain the intestine in the proper place, as no glass bar or other means was at hand, I first thought of passing a pair of hæmostatic forceps under the loop of the bowel through a hole in the mesentery, and retaining it in place by catching the skin at the edge of the wound, but finally concluded to pass a rope of iodoform gauze through the opening in the mesentery, fastening it to the skin on each side with a stitch. This admirably answered the purpose of the bar or pencil employed by Maydl. On the third day the bowel was completely divided down to the gauze by the Paquelin cautery.

She vomited a good deal after the operation. Besides this, and the need for the catheter, she suffered a great deal of pain, requiring first one-half a grain, and later one quarter of a grain of morphia for some days. Moreover, as soon as the bowel was opened, the abundant discharge of *fæces* passed into a genuine diarrhœa for two or three days. Her highest temperature, however, was only  $100.3^{\circ}$ , and it reached the normal on the ninth day. After this time she rapidly improved, and gained almost daily in weight and strength so that she was soon up and about her room.

The discharge from the artificial anus was very liquid, and though from so low a point in the ileum (six inches from the colon), seemed to consist in large part of a green fluid resembling almost pure bile. In consequence of the excoriation of the skin, she desired, if possible, to be rid of the artificial anus, which I explained to her could be accomplished by means of an intestinal anastomosis. About the middle of January, 1893, her sister came to me and showed me quite a handful of hard, scybalous masses which had passed by the natural anus, and declared her very firm belief that this was the "cancer" I had felt. Taken in connection with her annoyance from the artificial anus, and her desire to be rid of it, I decided upon a second operation, with the full consent of herself and her husband.

This I planned as follows: I did not believe that I had mistaken the scybalous masses for a cancer, for it seemed to me they would not account for the recurring and severe pain for eighteen months, during which time the bowels had been constantly open, nor would they account for the great loss in weight. Still, as it was possible, and I certainly hoped that I might be mistaken (especially as no tumor could even now be detected on palpation of the abdomen), I determined to make an opening at the outer border of the right rectus and establish first the diagnosis. If then no cancer was present,

I would excise the artificial anus and re-establish the continuity of the ileum by an anastomosis. If a cancer were present, and could be removed, I should extirpate it, or if not amenable to radical treatment I would excise the artificial anus and effect an ileo-colostomy by means of Murphy's buttons, which I had just received a few days previously. Accordingly, I proceeded to operate a few days later.

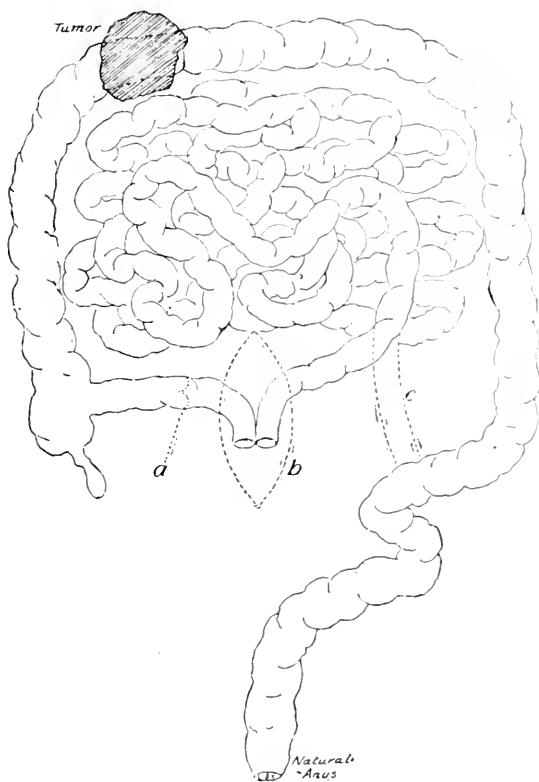


FIG. 1.

Diagram of the second operation, showing the tumor as a shaded area; (*a*) the point at which the ileum was closed and dropped back into the abdomen; (*b*) the dotted lines show the excision of the artificial anus established at the first operation; (*c*) shows in dotted outline the ileum swung round and anastomosed to the sigmoid flexure of the colon.

Second operation, January 30, 1883. Having determined to open the abdominal cavity, it was very important, of course, that infection

from the escape of faecal matter from the artificial anus should be prevented. I therefore first disinfected the skin all around the artificial anus. While I was doing this several spurts of intestinal contents took place, and I was again very much struck with their resemblance to bile. I then stuffed both ends of the intestine with gauze sufficient to prevent the escape of faecal contents or mucus.

First I made a vertical incision at the border of the right rectus, and as soon as I could get my fingers into the abdominal cavity I detected, at the hepatic flexure of the colon, the former hard mass, as large as a small orange, and fixed by adhesions so that it could not be drawn out. The smaller masses just above the ileo-caecal valve were not found, and were probably faecal masses which had escaped as the scybala referred to. The cancer being, therefore, determined to be present and also to be irremovable, I closed this wound. Next I made an incision at the outer border of the left rectus, and, after seizing the sigmoid flexure, passed a bit of iodoform gauze through its mesentery in order to find it quickly. I then passed my fingers under the artificial anus and seized that end of the intestine which led upward toward the stomach, and in order to prevent the escape of faecal matter passed a bit of iodoform gauze through its mesentery and tied it.

Next I dissected out the artificial anus by means of an elliptical incision. This required a great deal of care, for I found that where the loop of bowel had been drawn out strong, and extensive adhesions had formed between the bowel and the peritoneal surface. Having freed these, I excised the artificial anus, thus making a complete enterectomy. Next I closed the distal end of the ileum by two rows of Cushing's right-angled suture, and dropped it into the belly. Into the proximal end I then inserted one-half of Murphy's button (next to the smallest size), and placed the other half in the colon, making a vertical incision for the purpose. I was careful to see that this incision was no larger than was required. The purse-string sutures drew up the serous coat next to the central tube of the two halves of the button very satisfactorily. As, however, at the mesenteric attachment of the ileum there was, of course, no peritonæum, I had some fear that the adhesion might be imperfect at this point. The two halves of the button being now approximated with as much force as I deemed proper, I inspected the margins of the wound all round, and found them apparently perfectly secure. A number of vessels required ligation in a part of the mesentery of the excised loop in which the artificial anus existed.

The wounds in the belly wall were now sutured, and a wood-wool dressing was applied. The patient stood the operation (which lasted an hour and a half) very well, and was placed in bed in very good condition. I directed that no food whatever should be given by the mouth until hunger required it, and that meantime four enemata of peptonized milk should be administered in the twenty-four hours.

A small amount of morphia, with some atropia, was administered for a few days, and the catheter also had to be used. Her highest temperature was  $101.2^{\circ}$  on the day following the operation. On the second day she developed considerable cough, which I confess alarmed me a good deal for the integrity of the anastomosis, but in spite of that fact she had no further trouble. A moderate quantity of sterilized

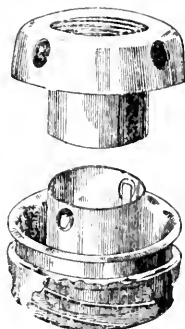


FIG. 2.

MURPHY'S BUTTON.—The cylinder of the lower half passes inside that of the upper. The two teeth, projecting through holes in the lower cylinder, catch in the thread inside the upper cylinder so that once the two parts are pushed together they can only be separated by unscrewing them.

milk was given after forty-eight hours. In the first twenty-four hours she passed a small amount of flatus, and at the end of forty-eight hours there were two liquid movements, amounting to two ounces each. Each one of these was preceded by severe pain. On the third day she had twelve movements, which were liquid, but two teaspoonsful of paregoric relieved her, in addition to half a grain of morphia, which she took for the pain. A very large amount of flatus passed during this day. The next day she still had a slight diarrhoea, but after that no further trouble occurred. At the end of ten days all the stitches were out, and on the twelfth day the anastomosis button passed, together with a slough consisting of the rings of tissue between

the two parts of the button. Her diet was gradually increased both in quantity and quality after the first forty-eight hours.

REMARKS.—I have reported this case alone, although it has been linked in principle with a number of somewhat similar abdominal cases which I have treated in a somewhat similar manner, for two reasons: (1) Because it is a rather rare case in the various steps of the operation, and ileo-colostomy itself is not commonly required. (2) On account of its being the first use (except as recorded in the author's paper, I believe) of the metal anastomosis button of Dr. J. B. Murphy, of Chicago.<sup>1</sup> It is also the first case in which the button has been used for ileo-colostomy. Murphy has recorded three cholecyst-enterostomies and four gastro-enterostomies in the human subject. All were completely successful. No other procedure than the establishment of an artificial anus and the later anastomosis, I think, would have been justifiable in this case. Her condition was such when I did the first operation, that, had I attempted anastomosis by any of the methods then in use, the prolongation of the operation, I am quite sure, would have cost her her life. Immediate anastomosis was carefully considered at that time, but we did not deem it a wise procedure. Had I then had Dr. Murphy's buttons I could have done the anastomosis so quickly that I think it would have been perfectly feasible, but his paper was not published until three days after the first operation was done.

The duration of the second operation was considerable, as the dissection of the artificial anus was very tedious on account of the widespread adhesions. Although these adhesions were a serious difficulty in the second operation, they have given me a confidence in the security of Maydl's operation for artificial anus, which is not without satisfaction.

As soon as I had made a diagnosis I closed the right lateral wound, which required, of course, but a very few minutes. It may be asked why not make a median incision above the umbilicus, both for the purpose of making the diagnosis and of doing immediately an ileo-colostomy in the transverse colon, instead of

<sup>1</sup> N. Y. Medical Record, December 10, 1892.



PLATE I.



Photograph of the patient's abdomen (as she lay on her right side) to show the three incisions.



making three incisions. I think this would not have been advisable for the following reasons: The ileo-caecal valve was so apparently the focus of the attacks of pain prior to the first operation that I thought it possible the obstruction might be at any point in the ascending colon, and an incision in the median line above the umbilicus, unless it were so large as to admit the hand, would not have given me access to the entire ascending colon nearly so well as the lateral opening; and again, in case I had found by the right lateral opening that the malignant tumor could be removed, I should have proceeded to excise it at once. This could not have been done, of course, nearly so well through a median incision as through a lateral one on account of the adhesions. In fact, now that I have made two incisions on several occasions in abdominal operations, I feel that multiplicity of incisions is not a matter of very great moment. Ready access to the focus of disease is far more important than whether there shall be one, two, or, as in this case, even three incisions in the abdominal wall. The danger of hernia is of course increased, but with proper suturing of the abdominal wall, and subsequent proper care after the operation, the danger of ventral hernia is not great. (See Plate I.)

Secondly, the use of Murphy's metal button. The button of Dr. Murphy, as will be seen by Fig. 2, consists of two cup-shaped discs or bowls, from the middle of which protrudes a hollow cylinder. This cylinder in one bowl has a thread on its internal surface. The cylinder of the other half is pushed within the cylinder which has the thread on it. It could easily be withdrawn after being pushed home but for the fact that through two openings in the side of the male cylinder project two teeth which catch on the thread of the screw, and practically make the two parts of a male and female screw.

In this manner, once the two parts of the button have been pressed together, they can only be detached by the rotary motion of unscrewing, but they are screwed up by simply pressing them together. After being pressed together, the two layers of intestine would shrink by loss of their fluids, and might allow of leakage. To prevent this the rim of one-half of the button is

pressed upward by a spring, which thus keeps the two layers of intestine in contact as they shrink, and insures complete sloughing of the tissues between the edges of the two parts of the button.

It is certainly a most happy mechanical invention, especially the method of fastening it by what is practically a secure screw, and yet instead of being rotated in order to fasten it, it simply needs to be pushed home. The two projecting teeth, which answer the purpose of the thread of the male screw, make it one of the most ingenious devices I have ever seen. I confess I used it with some hesitation, as one always does a new instrument. I especially feared trouble at the mesenteric attachment of the bowel, where, however, I used the utmost care to see that its edges were well tucked in. In order to accomplish this, I think it very important that the free ends of the drawing string should emerge at some other point in the circumference of the bowel than near the mesenteric attachment. In applying the drawing string I did not apply the two strings recommended by Murphy, but used only one, the ends of which emerged opposite to the mesenteric attachment.

Two objections have occurred to me as to the use of the button, to one of which I do not attribute much importance, although it has some. The other, however, may be a serious objection. The first is whether such a large mass will always readily pass the ileo-cæcal valve. We all know, on the one hand, that a considerable number of cases have been reported in which the plates of artificial dentures with several teeth attached have been swallowed, have passed the ileo-cæcal valve and have been voided without difficulty. But certainly a much larger number of cases of intestinal obstruction from gall stones have been reported. Pouzet<sup>1</sup> has collected twenty-seven operations for such obstructing gall stones, to say nothing of the cases which have died without operation. Gall stones are less irregular than the artificial dentures and more nearly approximate in shape and size the Murphy buttons, and yet are capable of producing serious and even fatal intestinal obstruction. On the whole, however, I do not

<sup>1</sup> *Archiv. Provinc. de Chir.*, August, 1892.

feel that this objection is a very serious one, since the condition requiring the use of the buttons, if they be used, is one which must dominate all other risks. Fortunately, in the particular case here reported, the anastomosis was below the site of the ileo-cæcal valve, and I had nothing to fear, therefore, from such an obstruction. Moreover, in the seven cases so far reported by Murphy, no such difficulty was encountered, though it was uncertain in at least one case whether the button had ever escaped. It is curious to note that in one of his cholecyst-enterostomies gallstones of the same size as the button escaped on the eighth day, while the button was not passed till the eighteenth day.

The second objection is more serious. If the button be used in a gastro-enterostomy I do not see that there is any factor which will absolutely determine which way the button will go when it has become loose. The natural current of peristalsis, or of the food would, of course, tend to take it from the stomach into the bowel and carry it toward the rectum, but I can readily conceive it possible that the button might fall backward into the stomach, especially in the recumbent position, and if the stomach were not in active peristalsis, forcing the food into the intestine at the moment when the button became loose; and such a foreign body in the stomach might prove a serious source of danger. So, too, in case of lateral anastomosis of the bowel, the button, instead of passing on, might slip into the cul-de-sac between the new growth and the anastomotic opening, and there create a similar danger. Both of these possibilities are theoretical, and until the method has been repeatedly tried we cannot be sure that they have any weight, but they should certainly be considered.

That the button is not only ingenious, but in not a few cases will prove very useful, I have no doubt. The speed and certainty with which an anastomosis can be made, once that the bowel is prepared for it, are certainly advantages which the button possesses over all other means of anastomosis, whether by simple suturing or by bone plates, catgut or other rings. Murphy states that he has completed the operation in from eleven to twenty-one minutes. The question of speed in such abdominal operations is

of the utmost importance, and this device is by far the quickest of all means of anastomoses. It will be observed that I did not put any re-enforcing Lembert or other sutures around the intestine after I had clamped the button. I was so well satisfied with the security of the button that I was perfectly content to let it go without any additional sutures. Care will always have to be used to see that the silk for the drawing string is moderately stout, although not clumsy, and that in drawing it tight it is done evenly and carefully, but more especially, in clamping the two halves the greatest care must be exercised to do it gently, to see that no part of the bowel escapes the grip of the rings, and that then the two halves are driven completely home, in order to secure eventually sloughing of all the portions of the intestinal walls included between them.

#### POSTSCRIPT.

*Post-Mortem Examination.*—After the above paper was in type the patient died very suddenly on March 18. The cause of death was an ulcer in the ascending colon, followed by sudden perforation and death in ten hours. She was unusually well on the 17th, and slept excellently until 5 o'clock on the morning of the 18th, when she was suddenly awakened by agonizing pain. By noon she was in collapse, and died at 3.30 in the afternoon. I was not aware of her illness until after her death.

The post-mortem examination was made by Dr. Lippincott on the 20th. He found a universal peritonitis, and surrounding the ascending colon a great many dense old adhesions. He intended to take out the entire colon from the ileo-cæcal valve to the rectum, but by an unfortunate accident only removed the ascending and descending colon with parts of the ileum. The error doubtless arose from his removing first the descending colon, thus destroying the continuity of the large bowel.

(1) The point of anastomosis is of great interest. From the outside one would almost think that it was a normal termination of the ileum in the colon (Plate II, Fig. 1). On cutting a window into the colon (indicated by the dotted line in Plate II, Fig. 1), the point of anastomosis is seen to be a perfectly circular aperture (Plate II, Fig. 2). No more perfect union could be imag-



FIG. 1. The anastomosis of the jaw and the window.



FIG. 2. The anastomosis of the jaw and the window. The dashed line indicates the window opening in the jaw. The 'X' mark indicates the jaw from within. See Fig. 1.



ined. It measures  $\frac{1}{2}$  inch in diameter. The size of the button by which the opening was made is 1 inch in diameter, showing that *the aperture in the forty-seven days since the operation had contracted to one-half of its original diameter.* The entire colon at the point where the anastomosis was made is narrowed to 1 inch in diameter, the diameter of the colon toward the splenic flexure being  $1\frac{7}{8}$  inches, and at the lower (rectal) end  $2\frac{1}{2}$  inches.

The contraction of the anastomotic opening, it seems to me, is an extremely important point; in fact, the pivotal point, upon which rests the utility of the button. It suggests the query whether the contraction would not have gone on until it practically would have rendered the anastomosis fruitless, thus fulfilling the fear expressed by Dawbarn.<sup>1</sup> Whether end-to-end anastomosis in the small bowel would be followed by similar contraction is an open question, but it certainly seems that in a lateral implantation the buttons will not be as useful as the ordinary anastomosis with large openings. I should suspect, also, that in a case of gastro-enterostomy the contraction would be a very serious matter after a time, and might make the operation of no avail. If, also, the button should drop back into the stomach, or into the proximal cul-de-sac of the bowel in a lateral anastomosis, it would never be able to escape through the constantly narrowing orifice. This is, I believe, the first post-mortem recorded after the use of the button, and it has convinced me that the button should be abandoned for intestinal or gastro-intestinal anastomosis. The opinion expressed in the earlier part of this paper as to the ingenuity displayed in the construction of the button is in no way changed, but the favorable opinion as to its usefulness I think must be modified. It will find, however, a most useful field in cholecyst-enterostomy, where only bile and no solid matter has to pass through the opening, and the contraction would not be an obstacle to permanent success.

(2) The specimen of the ileum and ascending colon consists

<sup>1</sup> ANNALS OF SURGERY, February, 1893, p. 155.

of a portion of the ileum  $4\frac{1}{2}$  inches long and of the colon  $4\frac{1}{2}$  inches long, measuring from the ileo-cæcal valve. Directly through the anterior longitudinal band, just above the level of the ileo-cæcal valve, is a perforation which is now  $1\frac{1}{8}$  inches in diameter, but which was originally, Dr. Lippincott tells me, considerably smaller. It was torn during the manipulation of removal. The perforation resulted from a solitary ulcer, and was the cause of the fatal peritonitis. The whole of the walls of the ileum and colon are thickened, so that they are almost as thick as sole leather, and are very stiff. This thickening is most marked about the ileo-cæcal valve and the caput coli. In fact, opposite the junction of the ileum and colon the wall of the cæcum is nearly half an inch thick. The opening of the ileo-cæcal valve is greatly narrowed, and is so small that it will not admit the tip of my little finger. In the caput coli was found a small fragment of quartz,  $\frac{1}{4}$  of an inch long, which had done no apparent harm. The appendix is normal, has a length of  $2\frac{1}{2}$  inches, and is free. The portion of the colon removed is greatly pouched. The closure of the free end of the ileum at the time of the second operation is perfect.

Dr. D. Braden Kyle made the microscopical examination, and submitted the specimens to Profs. Longstreth and Coplin, who confirmed his opinion. He reports as follows: "Sections were made from the border of the ulcer, from the upper end of the colon and at the free end of the ileum. No evidence of malignant growth could be found. The tissues were all chronically inflamed and somewhat softened, the process involving all the layers of the intestine, but showing no definite structure. The embryonic cells, it is true, resembled the embryonic connective tissue cells of sarcoma, but from their general appearance I would conclude that they were only 'indifferent' cells, of inflammatory origin. I was decidedly inclined to think that the body had been injected with chloride of zinc before the autopsy, but Dr. Lippincott states that this was not the case. The reason for this suspicion was that under low power there were seen at certain points masses which resembled nests of cells, but which higher powers showed not to consist of cells at all, but looked like material that had been



injected into the tissues. The odor of the specimen also resembled the odor of intestinal specimens from zinc subjects in the dissecting room."

(3) The question of diagnosis is an important one. Unfortunately, the post-mortem does not entirely clear this up. The omission to remove the transverse colon leaves in doubt the character of the mass which Dr. W. J. Taylor, Dr. J. Chalmers Da Costa and I felt there at both the first and second operations. Whether it was really a carcinomatous nodule, or whether it was a fecal mass in one of the thickened pouches of the colon, or possibly an enlarged gland adherent to the colon, must remain in doubt. The microscopical examination of the colon, by Dr. Kyle, would seem to make it unlikely that the growth was malignant, and from palpation of the specimen one can see very easily how, even without any concretion, the thickened pouches of the colon might be deemed to be malignant, and that any moderate sized fecal mass, especially if it were hard and pocketed in one of these pouches, and thus comparatively immovable in relation to the gut, might easily be mistaken for a carcinomatous mass. But I am by no means clear that this simple explanation is the true one. I received the specimen just as I was correcting the proof of the first part of this paper, and had, therefore, an opportunity to change the title of the paper, but I preferred to let it stand as I had first written it, "Cancer of the Colon," partly because there is really a doubt as to whether it might not have been cancer, but especially to call attention to the condition of the colon, which, if not malignant, might easily be mistaken for such a condition, and which certainly required the same treatment as obstruction from malignant disease. If not malignant, the disease, so far as the microscope shows, seems to have been a chronic ileocolitis, with its focus at the ileo-caecal valve, extending upward in the colon to an uncertain distance, and also to some distance in the ileum. This had produced enormous thickening and great pouching of the walls of the colon, and had bound it down by extensive adhesions so that it could not be brought into the median wound at the first operation, and to a great

extent had obliterated the opening of the ileo-cæcal valve. Both the condition of the colon and that of the ileo-cæcal valve would produce intestinal obstruction mechanically, and to this is to be added the interference with the normal peristalsis, both by the thickening of the walls of the colon and by the adhesions. The formation of the temporary artificial anus and the later ileo-colostomy seem to me, therefore, the only possible rational treatment.

# THE USE OF AIR TO DILATE THE BLADDER IN SUPRAPUBIC CYSTOTOMY.

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IN the course of the demonstrations at the Long Island College Hospital it has been my custom to demonstrate Retzius' space by inflating the bladder with air through the urethra. I have always been able to lift the peritoneal fold fully two inches above the symphysis pubis with ease. While making some experiments on the cadaver with regard to suprapubic cystotomy, according to the usual method, I injected the bladder with water, first having stuffed the rectum with tow to take the place of the Trendelenburg rectal bag. After numerous trials I found that after dilatation of the bladder by ten ounces of water, not over half an inch of space could be expected to intervene between the symphysis and the peritoneal fold, no matter how great the distension of the rectum. Yet, in the dissecting room in many more cases than I can number, I had by means of air readily lifted this fold so that two to three inches of bladder wall rose above the symphysis uncovered by peritonæum and available for an incision, and this without anything in the rectum whatsoever. These demonstrations, however, had always been made with the abdominal parietes laid open. I asked myself the question whether the same thing would happen if the abdomen were unopened before the insufflation of the bladder. With the kind permission and assistance of Dr. Van Cott, I accordingly made a number of experiments at the morgue of the Brooklyn Hospital to determine the relative efficiency of air and water for this purpose. With regard to air, I found the behavior of the bladder in an unopened abdomen in no respect different from that which I had

observed in the dissecting room. The abdominal wall rose immediately over the pubic region on insufflation, and the position of the bladder in even moderately thick abdominal walls could be located with some degree of certainty by following the line of distension. Percussion, of course, gave more exact results. In short, in a number of experiments on the unopened cadaver, I found that without the use of the rectal bag it was quite easy, with air, to lift the peritonæum from two to three inches above the symphysis. Using the same volume of water, ten ounces, I could not depend on over half an inch. The question then naturally occurred, why not use air in suprapubic cystotomies as the dilating agent instead of water? Also, if it is desirable to lift up the *bas fond* of the bladder, why not use air in the rectal bag as well?

The most important point to be borne in mind in considering the relative merits of air and water as distending agents is the liability of the diseased bladder to rupture under any distension whatever. Now, water is almost absolutely incompressible. Suppose we inject three ounces of fluid into a bladder capable of containing but three ounces. Its walls are thickened by disease, yet between the muscular trabeculæ there are portions which are extremely thin. The natural irritability of a diseased bladder resents distension, and when injected with fluid it may contract spasmodically. The contained water being absolutely inelastic, all the strain is thus thrown on the weakened portions of the bladder walls, and rupture is more likely to occur. Besides, in a bladder which is incapable of much distension the addition of but a teaspoonful of water beyond its capacity is quite competent to produce a pressure of several pounds to the square inch. I have seen the hydrostatic test applied to steam boilers many times in various yachting experiences, and in a boiler capable of holding several hundred gallons, when full the addition of less than half a pailful of water by the pump will be quite sufficient to show a pressure of 300 pounds per square inch on the steam gauge, and the rapidity with which the pressure rises is remarkable. The laws of hydrostatics apply to the bladder equally, and I think from this illustration it is plain that a very slight addition

to the quantity of water in a non-distensible bladder already full is quite competent to produce rupture. There is a case on record in which rupture of the adult bladder was produced by the injection of less than four ounces of water. The water was non-compressible and refused to yield, and the bladder gave way as a consequence, being non-distensible and unable to stand hydrostatic pressure.

Air, however, is an extremely elastic and compressible gas, and is not open to the very serious objection of incompressibility which applies to any fluid. In the case of a non-distensible bladder it is quite evident, it seems to me, that as far as the liability to produce rupture is concerned air is very much safer than water. If the lungs are used for purposes of insufflation by blowing air through a rubber tube, no excessive strain can be thrown on the bladder, for I know by experiment that it is impossible in this manner to produce a pound of pressure on a gauge, at least with an ordinary pair of lungs. With air, because of its great compressibility, the whole strain of the additional volume is not thrown on the bladder wall, consequently a sudden spasm of a resentful bladder will compress the air instead of rupturing the wall of the viscus. There is another factor of safety with regard to air, and that is its imponderability. A pint of water will of itself weigh about a pound, and this weight might be sufficient to tear through the trabecular spaces of a diseased bladder. As regards the question of safety, air is an agent much to be preferred to water.

Its efficiency is next to be considered. I have asked myself whether air insufflation was competent to dilate a bladder, the walls of which were, perhaps, much hypertrophied. Yet in the dissecting room we are accustomed to see the students inflate an abdominal cavity, no matter how thick its walls. If a bladder is capable of dilatation at all I believe this can be accomplished by the use of air. I have never met a case in the cadaver in which air did not promptly lift the bladder out of the pelvis. There is a great difference in this respect between air and water. Water first fills up the lowermost parts of the bladder, and does not lift it out of the pelvis at all. In fact, the weight of the water has

a tendency to keep the bladder low down, and it is only as it is fully distended with fluid that the anterior wall rises above the symphysis. Indeed, the rectal bag must be used before the bladder can be brought well within reach. The first effect of the water is to distend the most dependent part of the bladder, which is the very part which does not concern us, with reference to the incision, and is besides most likely to give way. Air, on the contrary, at once lifts not only the anterior wall and fundus up against the abdominal wall, but the *whole viscus as well*. This fact was strikingly shown in my experiments. The very first syringeful of but four ounces of air caused the abdominal parieties to bulge slightly over the pubes, whereas with water nothing of the sort occurred, as the water ran down to the most dependent part of the bladder, and spread out laterally, distension taking place against gravity, with the bladder flattened out on each side by the weight of the contained fluid. With air, on the contrary, as the posterior wall of the bladder rests against the pelvic floor and its contents, the direction of least resistance to the entering and weightless gas is in the line of the fundus, and there being no weight in the bladder it is consequently brought up at once against the abdominal wall, and promptly carries the fold of peritonæum out of the way.

The question may here be asked whether there is not danger of infecting the bladder with the injected or insufflated air. With regard to expired air it is said to be sterile, therefore insufflation would not be open to this objection.

If it is desirable to measure the amount of air injected, and a syringe is used for purposes of inflation, it will be sufficient to interpose between the syringe and the injecting nozzle a glass tube filled with a filter of sterilized cotton. The danger of infection, however, is somewhat fanciful, as a bladder which requires suprapubic cystotomy is sure to contain pyogenic organisms already.

In opening the bladder afterward, air has another advantage over water, which is that it gives a dry wound instead of one filled with blood-stained fluid escaping from the opening in the incised bladder wall. It may be urged against inflation that

because of the compressibility of air, the amount of distension cannot well be estimated, nor the quantity of air measured. In my experiments on the cadaver I had no difficulty in determining the locality of the bladder by percussion, and the quantity of air was measured naturally by the capacity of the syringe used. There should be no difficulty in making similar estimates in a hypertrophied bladder, because, if it can be distended at all for the purposes of the operation, it must rise above the symphysis, and what water will do in this direction air will accomplish much more safely. The question of hypertrophy does not concern the agent used to distend the bladder so much as the degree of force which may be safely used in the distension, and in such a case air appears, for the reasons given, to be safer than any fluid. Thickened bladder walls, it is true, might, to a certain extent, mask the resonance of the contained air, yet in such a case it is equally true that it would be difficult to appreciate increased dulness when fluid had been used. The increased resonance in one case would be greater than the increased dulness in the other. If a hypertrophied and thickened bladder can be lifted in the pelvis *at all*, if by its distension the fundus can be carried above the symphysis and the anterior wall thus rendered available for the extraperitoneal incision, air, adding as it does *no weight* to hold the viscus anchored in the pelvis, will, by virtue of its elasticity, prove not only more efficient but far safer than water.

For the purpose of retaining the air in the bladder, I have found the best method to be compression of the urethra at the hands of an assistant. It is sufficient to insert within the meatus the conical nozzle of a hard-rubber syringe, which is pushed in far enough to prevent the air from escaping by the side of the nozzle. If there is, however, such obstruction at the neck of the bladder as to forbid this, a soft catheter may be slipped over the syringe-tip and the air thus compelled to enter the bladder.

## APPENDICULAR COLIC..

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CASES of colic of the vermiform appendix must be of by no means rare occurrence, but owing to a variety of circumstances they have been rarely described or diagnosed. One of the reasons why we have not heard more of this trouble is that cases of it have been mistaken for or classified as appendicitis, typhlitis or perityphlitis. The case which I report in this paper was diagnosed by several able physicians as appendicitis, a diagnosis in which I fully concurred.

### REPORT OF CASE.

Mrs. X., aged twenty-seven years, Kansas City, Mo., had an attack of (what was supposed to be) typical appendicitis in May, 1892. Similar illnesses have been passed through in the months of August, September and December of the same year. Ever since the first of these illnesses there has been marked tenderness constantly present in the right iliac region, limited to McBurney's point. I saw her in consultation with Dr. E. W. Schauffler, in the end of January, 1893.

*Status Præsens.*—Patient is a well-nourished and fairly healthy young woman, who has always taken the greatest care of her health. Menstruation is regular. Bowels inclined to be costive, requiring laxatives to be frequently resorted to. Temperature is slightly elevated. Examination of the abdomen reveals nothing beyond marked tenderness over McBurney's point, with a slight local increase in resistance there. Rectal and vaginal examination give entirely negative results. Other organs healthy. Patient has not had an acute attack of her trouble since December last; tenderness, however, as above noted, is always present, and her general



health is not so good as it was prior to this illness. A diagnosis of recurrent appendicitis was made and the removal of the appendix advised.

February 12. Chloroform having been administered by Dr. Schaufler, with the assistance of Drs. Griffith and Lilly I removed the vermiform appendix under the usual precautions. The appendix was about three inches in length, had a long mesentery, and was in a straight, stiff, hard condition pointing toward the pelvis. There were no adhesions. The organ contained three foreign bodies, each about three times the size of a grape seed, consisting of inspissated fæces. At a point over one of these bodies the peritoneal covering was slightly reddened: apart from this, and perhaps its rigidity, the organ was apparently absolutely normal. Microscopic examination showed some thickening of the muscular coats.

The course of recovery presented nothing worth noting, and to-day the patient is *well*; the tenderness which distressed her for such a long time has totally disappeared.

In this case the small area of peritoneal redness over a foreign body contained in the appendix makes one strongly suspect that inflammation was imminent if not already present, but this condition was absolutely insufficient to account for the symptoms manifested. In the previous attacks, the history of which was that of typical recurrent appendicitis, there could have been little or no inflammation present as apart from the spot of redness and the fæcal concretions; there was nothing abnormal about the organ and no evidence of any former trouble. That the appendix was the seat of trouble is proved by the constant and marked tenderness over McBurney's point, and the fact that since its removal every symptom has disappeared. The only hypothesis which can explain this trouble is that the presence of the foreign bodies set up colic in this organ. That this hypothesis is not mere theory I hope to show further on in this paper.

I can find notes of but two similar cases.

In a discussion before the New York Surgical Society Dr. Kammerer described a case in which there was a marked history of recurrent appendicitis, in which he operated during one of the exacerbations. At the time at which Dr. Kammerer

operated acute perforative appendicitis was exactly simulated. There was high temperature—quick, weak pulse—coldness of the extremities—sudden pain and some tympanitis. The only reason why operation was not performed before this attack was the unwillingness of the patient. On operation, the appendix was found “to be about four inches long, absolutely rigid, and projecting into the pelvis in a straight direction. It was completely filled with faecal concretions. It was ligated at its base and cut away, and the abdominal cavity was entirely closed. The patient made an uneventful recovery, and has not had a single attack since the operation (now half a year ago) nor any rise of temperature, showing conclusively that the appendix was responsible for her condition upon operation, if not for the extreme collapse immediately preceding it.”<sup>1</sup>

A second case is fully reported by Dr. von Hochstetter,<sup>2</sup> and this case is in every way remarkable. Patient was a woman aged forty-nine years. In November, 1880, her illness began with severe colic in the right half of her abdomen. This was so severe that it confined her to bed for one and one-half years. After this time patient was able to be up for several months at a time but had to go to bed again every now and then. In April, 1889, the pains became more intense and continued without intermission. In the end of October, 1889, the patient presented the appearance of a very sick woman. Nutrition was fair; face pale; temperature not elevated. Besides the pains already described, patient complained of flatulence and constipation. On examination nothing but tympanitis and abdominal tenderness, with a slight increase in resistance on the right side of the abdomen, noted.

An exploratory laparotomy was performed. The processus vermiformis was found to be stiff and hard like a solid body. There were no adhesions. It contained no foreign bodies, unless a few threads of mucus could be so called. The organ was in a condition of chronic catarrh without any ulceration. Removal of

<sup>1</sup> ANNALS OF SURGERY, Vol. XVII, No. 2.

<sup>2</sup> Festschrift gewidmet Th. Billroth.

the appendix gave absolute relief to all the symptoms which had been suffered from.

This chronic catarrh, spoken of by v. Hochstetter, must evidently have partially or completely closed the opening of the appendix into the cæcum and the efforts of this organ to expel its contained mucus gave rise to the cramp-like or colicky pains to which the patient was a martyr.

That the vermiform appendix has great expulsive power is shown by a case mentioned by Dr. Parker Syms,<sup>1</sup> in which "during oöphorectomy the vermiform appendix came into view and, although healthy, was removed because of its great length (over five inches) lest it should cause future trouble. The point of interest connected with it was that after its removal it continued for almost ten minutes to squirm on the plate very much as a grub worm might do, and, finally, a formed fecal movement took place from it." An organ with this amount of expulsive power if irritated and, especially, if owing to swelling, stenosis, or twist, its outlet is more or less completely closed, may well give rise to intense colic.

Can we make a differential diagnosis between appendicular colic and appendicitis? *Prima facie* one would be inclined to say yes. One would *imagine* that in the colic there would be no fever during the attacks, and that the pain would be relieved by pressure. That between the attacks pain and tenderness would be entirely absent. But a careful study of the few cases reported shows such an idea to be erroneous. We may have high fever during an attack of colic; we do have very marked tenderness, especially over McBurney's point; we may have extreme collapse and all the signs and symptoms of acute perforative appendicitis. In the *intervals* between the attacks we may and do have that classic sign of appendicitis, tenderness at the McBurney point, and palpation may give us a sensation of increased resistance or fulness. Altogether it seems to me that with our present knowledge, or want of knowledge, while a diagnosis of probability may be made, a positive differential diagnosis is rarely possible. Of course,

<sup>1</sup> ANNALS OF SURGERY, Vol. XVII, p. 203.

these remarks do not apply to some cases of chronic appendicitis which have reached the stage of suppuration, the suppuration being localized by the formation of adhesions all around. Here we may have positive signs of inflammation, even fluctuation and inflammatory œdema of the skin. Where pus is believed to be present it may be demonstrated by the use of the long needle and the Pravaz syringe. This method of exploration is, however, unsatisfactory because, when by its means pus is not found, we are no more sure of its non-existence than if no exploration had been made. A much more satisfactory method of exploration is by incision, which gives positive results, and is *at least* no more dangerous than the former procedure. Exploratory incisions may be made under cocaine anæsthesia with satisfaction where a general anæsthetic is contra-indicated. Such explorations, whether made by the needle or the knife, must be carried out with full aseptic precautions.

Where there is some probability of the trouble from which a patient is suffering being appendicular colic, we may follow the treatment outlined by Gersuny and Beuer, who claim to have cut short attacks of this trouble by massage applied to the right iliac region. The cases spoken of by Gersuny and Beuer have never come to anatomical demonstration. My strong personal belief is that the treatment for appendicitis and appendicular colic ought to be the same, viz., removal of the offending organ. The operation, when performed by a surgeon who understands and *practices* clean surgery, is accompanied with but trifling danger, while appendicitis is a constant menace to life, and appendicular colic is apt to render life miserable. The treatment by massage already referred to may do good in cases of pure colic, but should the diagnosis be at fault, and the disease be appendicitis (an error in diagnosis likely to occur in the most experienced hands), then the massage is calculated to do great and irretrievable harm.

A METHOD FOR OBTAINING A SKIN-FLAP FROM  
THE SCALP AND A PERMANENT BURIED  
VASCULAR PEDICLE FOR COVERING  
DEFECTS OF THE FACE.

By THEODORE DUNHAM, M.D.,  
OF NEW YORK.

IN the treatment of the following case I have used a form of plastic operation which, so far as I have learned, is new.

Though of rather limited application, I venture to hope that it will add materially to the resources of plastic surgery.

The patient, M. C., is sixty-two years of age and a Russian Pole. Four and a half years before operation there appeared on his left cheek, below the middle of the eye, a little sore. It did not heal. After a few weeks he consulted a physician, who burnt it with a white stick. This made it larger, and it still refused to heal. Several times it was cauterized, and each time left larger than before. At one time he entered one of the larger hospitals of New York. A paste was twice applied, without good result, and it was then decided to curette the sore. This treatment he declined, and he left the hospital.

In August, 1892, he came under my care. His condition is well shown in the first figure, which was taken August 23, the day before operation. On the left cheek, and extending to the left side of the nose, was an ulcer with an uneven base, in places whitish or grayish, in places pinkish, over most of its area moist, and in places covered by epidermis. The border was irregular, especially so on the cheek, slightly tumefied and indurated, and in places of a dull reddish tint. At the borders the disease appeared confined to the skin. Near the centre of the base there was barely more than the periosteum covering the bone. No glands were felt. The ulcer had drawn toward itself the surrounding structures, pulling up the ala of the nose and the corner of the mouth. A specimen was removed from the border on the cheek and submitted for examination to Dr. Edward K. Dunham, who reported it an epithelioma.

August 24 I operated. The ulcer was encircled by an incision

about half an inch from the margin of the ulcer, and the tissues included in the incision dissected off. The anterior surface of the upper jaw was laid bare and scraped. The bone and the deep surface of the periosteum appeared normal. The wound surface finally consisted, above, of the conjunctiva of the eyelid; below, of the mucosa of the lip; between the two, of the upper jaw; and internally, of the periosteum of the nasal bones.

A flap of appropriate size and shape was now cut from the scalp. This was quickly done, as it had been previously outlined in silver by marking on the skin with a moistened stick of lunar caustic, then wetting the line with salt solution, and blackening the white line by exposure to light. The proper shape had been arrived at by cutting from a piece of felt a model of such a shape that when turned down on its pedicle it would just cover the prospective defect in the face. This flap was so cut as to contain, traversing its pedicle and ramifying in it, the anterior temporal artery. It had rather a long pedicle, about an inch wide, attached in front of the ear, and the mass of the flap was from the upper forehead where it slightly crossed the median line.

The flap was turned down and its periphery stitched to the margin of the wound in the face. This caused the narrow pedicle to lie across the side of the face, forming a nutrient bridge for the flap.

During the early days after operation the flap was a little swollen and dusky, and the pedicle was a little tender. These symptoms gradually subsided. Seven days after operation union was complete and the stitches were removed.

The second photograph was taken three weeks after operation. It will be seen that the flap was cut of such size and shape as to allow the ala of the nose and the corner of the mouth to drop back into their normal positions. (Fig. 2.)

At this time the dependence of the flap upon its vascular supply through the pedicle was tested in the following manner: A clamp was applied to the pedicle so as completely to check circulation through it. The effect of this was that the flap very rapidly became blanched in the upper portion and purplish below. The clamp was left on for seventeen minutes. When it was removed, the flap quickly flushed to a brilliant red, and this hyperæmia lasted several minutes.

September 16, twenty-three days after the first operation, I performed a second. The granulations were scraped from the wound in



Fig. 1. Patient in new position before operation.



Fig. 2. Three weeks after operation, head flap headed in new position.



Fig. 3. Patient in new position.





the scalp and a compress applied. The pedicle of the flap was then incised along its entire length on the line of the artery. The artery with its accompanying vessels was dissected free from the rest of the pedicle. This was done by making the cut divide at the vessels and pass to either side of them, thus cutting the pedicle into three strips, two of scalp tissue and one a bundle of vessels. The anterior ends of the first two were cut free from the flap in the cheek. Later they were stitched together and turned up to their natural site on the temple and sewed in place. The circle of suture round the flap was completed by a few stitches where the cutaneous portions of the pedicle had been cut free from it.

There was now a raw strip of tissues, containing the anterior temporal vessels, lying across the side of the face, stretching from just in front of the ear to the edge of the flap in the cheek. An incision was made in the face directly beneath this strip, and the edges of the incision raised a little by dissection, so as to form a trough for the reception of the vascular strip. The strip was dropped and in the edges of the skin sewed together over it. A small drain was carried into the wound above the ear and so placed that it just entered the subcutaneous passage for the vessels.

During the whole operation the flap in the face did not once change color.

The wound in the scalp was covered by a few Thiersch skin grafts from the thigh.

Recovery was uninterrupted. The flap on the cheek never showed a sign of faulty circulation, and the pulsations of the artery in its new situation could always be felt.

The third photograph was taken February 1, 1893, five and a half months after the first operation. There was no sign of recurrence of the epithelioma. The grafted area does not look very strikingly different from the rest of the scalp. The color of the flap remains excellent. The finger readily feels the pulsations of the anterior temporal artery as it runs along the side of the face to supply its portion of scalp on the cheek and nose.

METATARSALGIA (MORTON'S PAINFUL AFFECTION  
OF THE FOOT), WITH AN ACCOUNT OF SIX  
CASES CURED BY OPERATION.<sup>1</sup>

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THE affection that has come to be best known as "Morton's Painful Affection of the Foot," or "Morton's Toe," was first described and a method of certain cure presented by Dr. Thomas G. Morton, of Philadelphia, in 1876, under title of "A Peculiar Affection of the Fourth Metatarso-phalangeal Articulation."<sup>2</sup> In subsequent publications<sup>3</sup> he has confirmed his views relative to cause and treatment, and reported large numbers of cases.

The disease under consideration may be described as a painful affection of the plantar digital nerves, directly caused by pressure upon or pinching of them by certain portions of the metatarso-phalangeal articulations—especially the fourth.

The reason for the fourth toe being the almost invariable seat of origin of the train of painful and neurotic symptoms to be described is ascribed to anatomical causes by Morton in the following language:

"The occurrence of neuralgia may be understood by a reference to the anatomy of the parts. The metatarso-phalangeal joints of the first, second and third toes are found on almost a direct line with each other, while the head of the fourth metatarsal is from one-eighth to one-fourth of an inch behind the head of the third, and the head of the fifth is from three-eighths to half an inch behind the head of the fourth; the joint of the

<sup>1</sup> Read before the Philadelphia Academy of Surgery, March 6, 1893.

<sup>2</sup> American Journal Medical Sciences, January, 1876.

<sup>3</sup> Surgery in the Pennsylvania Hospital, 1880, p. 107. Philadelphia Medical Times, October 2, 1880.

third, therefore, is slightly in advance of the joint of the fourth, and the joint of the fifth is considerably behind the joint of the fourth.

"The fifth metatarsal joint is so much posterior to the fourth that the base of first phalanx of the little toe is brought on a line with the head and neck of the fourth metatarsal, the head of the fifth metatarsal being opposed to the neck of the fourth.

"On account of the character of the peculiar tarsal articulation, there is very slight lateral motion in the first three metatarsal bones. The fourth has greater mobility, the fifth still more than the fourth, and in this respect resembles the fifth metacarpal. Lateral pressure brings the head of the fifth metatarsal and the phalanx of the little toe into direct contact with the *head and neck of the fourth metatarsal*, and to some extent the extremity of the fifth metatarsal rolls above and under the fourth metatarsal.

"The mechanism of the affection becomes apparent when we consider the nerve supply of the parts. The branches of the external plantar nerve are fully distributed to the little toe and to the outer side of the fourth; there are also numerous branches of this nerve deeply lodged in between these toes, and they are liable not only to be unduly compressed, but pinched by a sudden twist of the anterior part of the foot. Any foot movement which may suddenly displace the toes, when confined in a shoe, may induce an attack of this neuralgia. In some cases no abnormality or other specific cause for the disease has been detected."

This explanation undoubtedly will account for the great majority of cases, and perhaps all could be ascribed to pinching of the nerves between the metacarpo-phalangeal articulation. Yet there have been reported a few cases where the transverse metatarsal ligament has appeared to be lax or ruptured, thus permitting the metatarsal heads to descend upon the nerves. Auguste Poullosson, of Lyons, in 1889,<sup>1</sup> after reporting a typical case, says that "the cause of the affection is evidently a certain laxity of the transverse metatarsal ligament, which permits partial

<sup>1</sup> Lancet, March 2, 1889, p. 346.

infracture of the arch formed by the heads of the five metatarsal bones, one of the middle ones, probably the third, becoming dislocated downward and compressing the nerves running along each side of it against the heads of the neighboring bones."

L. G. Guthrie,<sup>1</sup> in writing of metatarsal neuralgia, states his belief that "under the influence of prolonged standing or walking in tight boots, the ligaments of one or more joints, metatarso-phalangeal or phalangeal only, become strained, slight subluxation takes place, the nerves are stretched and pressed upon by the partially dislocated bones, and the characteristic pain is produced."

In reference to the supposed dislocation above mentioned, Morton says:

"The dislocation referred to is not a true dislocation, but is simply a twist of the toe, and a violent spasmodic condition of the muscles of the toe incident to the intense pain, simulating a dislocation which, when the toe is compressed laterally and in its rolling between the third and fifth suddenly, presses upon and pinches the underlying plantar nerve branch."

Edward F. Grün,<sup>2</sup> himself a sufferer from the affection, believes that the pain results from descent of the tarsal arch, which is accompanied by lengthening of the foot and spreading to the outer side, so that "when the weight comes on the member the foot spreads inordinately; the boot is not constructed to allow for so much spreading, and a frightful cramping pain is the result, causing the patient to remove the boot without regard to place or circumstances—often the most inconvenient."

E. H. Bradford<sup>3</sup> states that the results of treatment in these cases, as well as the symptoms and localization of the point of severest pain, make him agree with Morton in believing the affection to be originated by pinching of the metatarsal nerve, rather than to flattening of the tarsal arch, as suggested by

<sup>1</sup> "On a Form of Painful Toe," *Lancet*, 1892, Vol. 1, p. 628.

<sup>2</sup> *Lancet*, April 6, 1880, p. 707.

<sup>3</sup> "Metatarsal Neuralgia, or Morton's Affection of the Foot." *Boston Medical and Surgical Journal*, 1891, Vol. 11, p. 52.

Poullsson. In none of his thirteen cases was any degree of flat-foot present.

In a large number of cases seen by me, in addition to those herein reported, it has not been possible to demonstrate any laxity of the metatarsal ligaments, and, while in a few the pain was referred to other of the metatarso-phalangeal joints than the fourth, yet upon careful manipulation it was always found that the pain was reflected from the fourth to the other joints. It must be conceded, of course, that laxity or rupture of the transverse ligament would predispose to injury of the nerves at the fourth joint by permitting greater motion of the overlapping bony points in that situation. However, while the exact etiology of the affection is of great scientific interest, clinically it is of small account, as excision of the fourth metatarso-phalangeal articulation, as originally proposed by Morton, or amputation of the fourth toe, including the corresponding metatarsal head, invariably has secured an absolute and permanent cure. No dissections of the diseased regions have yet been possible, nor have the nerves been in any case excised so that microscopical examination could be made. I have carefully examined a number of the joints that have been removed for the cure of the affection, and in no instance have been able to prove any anomaly or disease.

Metatarsalgia is, in its lesser degrees, a very common disease. Almost every one has suffered more or less, at times, from neuralgic twinges radiating from the joint in question. These mild cases occasionally develop into the more severe forms. In them occasional attacks of pain are often followed by periods of complete immunity.

Morton made extended inquiries among retail shoe dealers, and found "that this peculiar condition had not only been frequently recognized by them, but that it is also considered to be quite common. Almost every intelligent shoe retailer has seen a number of persons to whom this disease has been a source of frequent suffering, and who believe their malady to be beyond relief by medical art; indeed, it would seem that in some of the most severe of the cases it had been found impossible to obtain

the serious consideration of their condition by their medical attendants."

So recently as 1891 Bradford<sup>1</sup> has written :

" It is somewhat singular that an affection that is not infrequent in these days of thorough investigation of all ailments, should have attracted but little attention, either in the researches of surgeons or of neurologists. The cases are so usually classed among the ill-defined hysterical or nervous affections, and not thoroughly investigated; or they are deemed to be gouty, as in the minds of many practitioners, are frequently all affections of the toes."

The disease has not been observed before adolescence. Women are certainly more predisposed than are men, and its occurrence in the former sex I should judge to be almost twice as frequent as in the latter. One foot is most usually involved, especially in those cases apparently taking origin from an injury. But very frequently one foot is affected to an almost unbearable degree, while its fellow is but slightly involved. Neither right nor left foot appears to be most liable to involvement unless one or the other is constantly subjected to a motion, as in running certain sewing machines, looms, lathes, etc., while the other is not employed. In this case, as in one of my own, the pain developed in the foot so employed. When both feet become simultaneously affected the cause will soon be found in ill-fitting or tight shoes. Middle life is the period at which the disease is most apt to develop or to become severe. The aged are by no means exempt, although in them more purely gouty or neuralgic forms are prone to occur, and persons at any age, so predisposed, appear to be much more liable to the affection—idiopathic or traumatic—than are others.

The influence of heredity is very marked. I know of several families in which a number of persons, mainly confined to the female sex, are similarly affected. It is interesting to note that in these instances some cases have arisen from twists or sprains of the foot, and others apparently idiopathically.

The exciting or immediate cause of metatarsalgia is usually

<sup>1</sup> *Loc. cit.*

excessive or unusual exercise of the feet while confined in new, tight, or ill-fitting shoes, as in walking over rough surfaces (mountain-climbing), dancing, playing lawn tennis, etc., or in changing from a firm-soled shoe to one that permits great motion of the metatarsal arch. When the heads of the metatarsal bones are rigidly held in contact by a tight shoe it is reasonable to believe that a very slight twist or wrench of the foot would bring great pressure to bear upon the sensitive branches of the digital nerves distributed upon and about them, and, particularly in those predisposed thereto, bring about a neuralgic and even neuritic condition. This once set up, and the nerves having become sensitive, swollen or inflamed, ever so slight repetitions of the pressure or bruising are capable of originating the most agonizing suffering. Later, continuous or frequently recurring attacks of this pain, or actual ascent of neuritis, commence reflex contractions and other neurotic complications, perhaps of the gravest type, as witness in Case I of my series, where the patient had become bed-ridden and severely neurasthenic.

So far as relates to symptomatology, I shall depend upon quoting a few more or less typical cases from the literature of the subject and upon the histories of my own operative cases, but may here mention that I regard the *imperative necessity of removing the shoe*, regardless of surroundings, when a paroxysm comes on, as a pathognomonic symptom of the disease. It may also be said that no evidence of the disease can usually be felt or seen, except that the parts are often of a bluish tint and cold, from venous stasis, and have a tendency to profuse perspiration.

CASE I.—Miss I. F. S., aged thirty-one years, teacher, was brought to me by her physician, Dr. George L. Romine, of Lambertville, N. J., in June, 1892.

The following history was elicited: Family history excellent; she had always enjoyed the best of health and strength until the present trouble commenced. In July, 1890, she played lawn tennis for the greater portion of a day, coming down heavily on the balls of the feet many times, after which she walked a short distance to her home, and felt greatly fatigued. After resting two hours she attempted to walk, and experienced a "queer sensation" along outside of the left

foot, a feeling "as if something had given away about half-way between the toes and heel."

"In the evening I walked down town, but could scarcely return, for it was so hard to make my foot go. I felt as if retarded in some mysterious way. By the time I reached home a line of pain extended from the place above mentioned all the way to hip. Thinking I had sprained my foot, I applied the usual remedies. The next morning my foot felt rested, but during a short walk on the street the pain in my foot and limb returned.

"By this time the foot began to swell, particularly along the outside, and in a few days had a reddish appearance. After a night's rest the swelling disappeared, and I was able to use my foot, with intervals of rest, in ordinary walking about the house. Each day it gave out after less use, so at the end of five days I called in our family physician, Dr. Romine, of Lambertville."

It was presumed that a ligament or tendon had been ruptured, and fixation by bandages resorted to. On August 7 these dressings were removed.

"The foot and limb were helpless, and the whole side of the foot felt so indescribably bad that it made me faint. A starched dressing was then put on the foot and limb to the knee. For four or five days following I held my foot on a chair, but after that, during part of the day, on a pillow on the floor. Toward evening I had almost unbearable tingling in the foot, but this passed away on retiring. I never could rest my foot on the outside from the time of the accident without having that unbearable feeling in the foot, and at times the line of pain in the limb.

"At the end of four weeks the Doctor told me to stand with my feet even. Never shall I forget what I suffered that day. The limb had shortened so that the heel was about two inches from the floor, and in trying to stretch it down the bottom of the foot pained and tingled dreadfully. I was completely exhausted and deathly sick.

"Crutches were then ordered, and I commenced my hard work of learning to walk.

"My foot was so bad on the side, and a line of dreadful pain extended from about two inches from the fourth toe along the side of the foot and to the knee. After a time the pain in the limb seemed better, but the whole side of the foot felt unspeakably bad. The uncomfortable sensation did not seem confined to any particular place on the side, as it did at first.



“The 1st of October the physician advised my going to school in order to overcome my nervousness, and take my mind from the foot. I wore a worsted slipper.

“The last of October the Doctor commenced the use of a battery every night—the interrupted current being used. The sponge was applied under and over the toes five minutes, five on each side of the heel, and five under the knee. The toes twitched a great deal, and I always dreaded when the sponge neared the fourth and fifth toes, for I felt the sting and jerk along the injured side, and it made me sick. I could bear only a light pressure there. When applied under the knee I felt the line of pain down the outside of the limb, and often the toes would jump. When the current passed down the inside of the limb it felt agreeable.

“My foot always felt badly on removing the shoe at night, and the limb above was very much swollen and glossy in appearance.

“The last of July, 1891, I took a short walk, without support, along the piazza. That night my foot pained up to the knee, and I was unable to touch it to the floor for more than a week. I was careful to take only a few steps at a time after that. At the end of a year this was all I could do.

“If I rubbed the foot, or put it down otherwise than just flat when I stepped, I was unable to use it afterward.

“I used crutches all the time at school, so as not to overtire my foot again; but, in spite of all my care, I had that dreadful feeling on the side, and many days the line of pain up the limb.

“Often the foot had fits of shaking, which I could not control.”

She continued thus helpless, using crutches for locomotion, and became thoroughly neurasthenic, until June, 1892, when I saw her in consultation with Dr. Romine. We agreed that the diagnosis was clearly the peculiar painful affection of the fourth metatarso-phalangeal articulation, and that the other symptoms were probably but those of reflex neuroses; also that excision of the joint offered the only means of relief. However, it was determined first to try the effect of an ointment composed of ichthyol and lanoline, together with fly blisters in the course of the affected nerves. These measures proving of no avail, in July I removed the joint. At the same time it was thought best to divide the tendo-Achillis, as the heel had become much drawn up by contraction of the calf muscles, and did not relax even under anaesthesia.

From the moment of operation she never again experienced the

old pain, and immediately began to gain flesh and strength under massage, hyper-nutrition, and rest in bed for three weeks. At the expiration of this period she was walking about unaided, and soon was as well and strong as ever. Union by first intention was secured, no weakness of the calf resulted, and the amount of retraction of the toe is about one-quarter of an inch. She now wears an ordinary shoe, and can make almost any exertion without discomfort.

CASE II.—N. C., aged thirty-two years, female, servant, native of Ireland. Family history negative. Had always enjoyed good health until October, 1889, when she tripped in going down stairs, and brought her left foot down violently in saving herself. Instantly she experienced an intense cutting pain in the region of the base of the fourth toe. The dorsum of the foot became black and blue, while the whole limb was affected with a dull burning pain. For several days she wore a slipper; then the discoloration gradually disappeared and pain became more endurable. But she had to cut every shoe that was worn, to prevent pressure upon the painful area. This painful sensation gradually extended from the original location up the front of the tibia, and became very severe in that situation. This misled a prominent surgeon to diagnose periostitis of the tibia, and cut down upon and scrape the bone. She remained in the hospital eight weeks, and was discharged unimproved. In February, 1891, another hospital surgeon cut down upon and chiseled away a portion of the tibia. Again no improvement followed.

Early in 1892 the patient entered the Polyclinic Hospital, willing to submit to anything to obtain relief. At this time she was almost helpless, exceedingly neurasthenic, and had lost much flesh. The scars of the previous operations were very evident. The entire leg was blue and cold and somewhat atrophied, but beyond this nothing was evident except that the fourth metatarso-phalangeal joint and its surroundings were exquisitely sensitive to motion or pressure. From this point the pain was reflected up through the entire sciatic distribution. She was put to bed, and upon a milk diet for four weeks, while local counter-irritants and absorbents were applied, all to but little effect; the old pains and her general nervous condition persisted. I then excised the affected joint, and was amazed at her rapid progress to subsequent cure. Primary union was secured, and in three weeks she was walking about and entirely free from pain. Since then she has entirely recovered her former health and strength.

CASE III.—Mrs. E., aged thirty-five years, well-to-do farmer's

wife, seen in consultation with Dr. George L. Romine. Family history good. She is of a neurotic temperament, and faints easily. During last ten years she has been subject to attacks of neuralgia, affecting the left forearm. Three years ago she was seized with neuralgia, affecting the second and third fingers of the left hand. There was tenderness in the metacarpal region, whence pains were reflected up the forearm and arm, producing complete disability of the member. The parts were very painful to the touch, and slightly swollen. This condition persisted for four months, and then gradually disappeared. From this time until June, 1892, she remained well, when a marked attack of metatarsal neuralgia, affecting the fourth toe, supervened. This apparently did not follow an injury. The pain became continuous, and resisted all efforts for its relief, except when she laid down, when it would diminish or entirely disappeared. When I saw her, at the end of October, she had become bed-ridden, almost helpless, and exceedingly nervous, but nothing of disease was evident in the foot except the violent, unbearable pain that was invariably produced at the fourth metatarso-phalangeal articulation, upon the slightest pressing together, or rolling upon each other of the outer metatarsal bones. At this time, even the weight of a stocking could not be tolerated upon the foot. The pain extended into the peroneal and sciatic nerves. She had lost fifty pounds in four months. The calf on affected side measured one and a half inches less than its fellow.

The affected joint was excised, primary union secured, and she steadily regained her usual health. Pain has disappeared, and she can walk with comfort.

A maternal aunt of Mrs. E. injured her foot eight years ago, and suffered in much the same manner as did the niece. She had never been able to secure relief, and to-day is scarce able to walk across a room without bringing on a severe attack of the pain.

A sister of the patient injured her foot ten years ago, and was then confined to her room for twelve months, because pain developed whenever the member was placed upon the ground. For five years she was unable to walk upon the street, while at the present time she cannot walk far without originating an attack of metatarsalgia, and has to be extremely cautious in walking over uneven surfaces.

CASE IV.—Mrs. S. C., aged forty-five years, a missionary residing in Japan. She writes:

“When out walking in the city of Tokio, Japan, in the summer

of 1888, and wearing a new pair of high-heeled shoes, I felt first a slight pain, which soon increased to severity, in my right foot in the region of the fourth metatarso-phalangeal articulation. The pain became so intense that I could walk no further. These paroxysms of pain continued to return with the slightest aggravating cause, the disease gradually becoming worse, so that for two years past, when at home. I have seldom had a shoe on my foot, and was not able to bear the loosest shoe while riding in a carriage, being almost always compelled to remove it after entering. When suffering the most intense pain it was accompanied with a general nervousness of my whole system. Upon removing my shoe all pain and nervousness soon ceased."

I removed the affected joint in May, 1892. In three weeks the patient was able to walk about with great freedom in ordinary shoes, and has since remained free from pain.

CASE V.—Mrs. R. T., aged thirty-two years; Canadian; house-keeper. Has suffered for five years from well-marked metatarso-phalangeal neuralgia, involving fourth toe of left foot. No assignable cause. Attacks have been growing more frequent and severe progressively until she became almost invalided. Was compelled to remove shoe regardless of surroundings instantly upon supervention of the attack.

In December, 1892, I amputated the fourth toe together with the corresponding metatarsal head. In three weeks she was walking about as well as ever, and has been entirely relieved of all discomfort.

CASE VI.—Lizzie T., a Russian; single, aged twenty-two years; mill hand. This woman works the treadle of a machine with right foot. Two years ago began having pain radiating from fourth toe. The frequency and severity of these attacks—necessitating the removal of shoe—have increased steadily until she was entirely unable to work and had difficulty in walking.

In January, 1893, she entered the Polyclinic Hospital, and my resident, Dr. M. W. White, excised the affected joint under my supervision. Primary union occurred, and the cure has been complete.

Morton<sup>1</sup> gives the following graphic description of a case of metatarsalgia, written by a medical friend who had been a sufferer from the more severe form of the disease:

"I have suffered intensely at intervals from this affection for many years, and in all this time have never found medical man or

<sup>1</sup> Loc. cit.

layman who understood what I meant when I complained of it or alluded to it. It has been pronounced by surgeons who have examined my foot to be a subluxation or malformation of the articular surface of the first phalanx of the fourth toe, where it articulates with the fourth metatarsal bone, the concavity not being sufficiently concave. This I have long been convinced is an error.

“My own sensations have convinced me that the pain is caused by pressure upon a nerve, but what pressed upon the nerve I was unable to tell. The immediate necessity of removing the boot, and the relief afforded by manipulating the foot in a manner learned by experience, pointed to a dislocation; but the reduction of the displacement was never sufficiently sudden and marked to confirm the belief that there had been a dislocation.

“Now, after living for more than half a century, practising my profession for over thirty years, and suffering half my life with an affection not understood, and ranked with a disease so trifling as a corn, I find myself enlightened and the mystery cleared up by your valuable paper on the subject.

“The first paroxysm occurred in my boyhood, and was produced by tight lacing of skate-straps. On unbuckling the straps, the ‘cramp,’ as I called it, was at first soon relieved and thought nothing of; but a continuance of this system of squeezing by tight straps and tight boots, and riding for hours on horseback with the flexors of the leg and foot in violent action, and the toes turned in, the attacks became more frequent, more painful, and the abnormal condition of the parts became chronic. These were in my case undoubtedly the causes predisposing. The causes determining the accession of a paroxysm are the wearing of a badly-fitting boot, especially if the sole be narrow; a long and fatiguing walk, particularly on a hot day over a hot pavement; a long ride on horseback; a wet boot sticking to the sock; a wet sock sticking to the toes; long-continued flexion of the knee joint, as in a railroad-car, carriage or lecture-room; treading on an uneven surface, as a cobble-stone pavement; and, should the nervous system be depressed from any cause, these exciting causes will act more powerfully.

“The symptoms of an attack in my case are most intense pain, ‘cutting to the heart,’ sickening, a feeling that it is unendurable, faintness, cold sweat, total incapacity for the time of directing the mind or will to any other subject, a horrible increase of torture on the use of the bootjack; and all this with no redness, no swelling,

no abrasion of the skin, no callosity, no visible displacement of bones, at least after removal of the boot.

“The suddenness of the attack is noteworthy. I have been obliged to drop everything and remove my boot, sometimes in company, sometimes in my carriage. I have even been obliged to sit down on the curbstone and remove the boot. I have dismounted from my horse and sent home for slippers before I could proceed. I have tied my horse to a tree and lain on the ground unable to ride further.

“I have spoken of a tight boot and of removing the boot, but I have had tight boots which were great favorites, because they would not ‘let my toe out of joint.’

“The remedies from which I have obtained relief are removal of the boot and then manipulating the toes—straightening them out. When inconvenient to take off the boot, I have found that grasping the foot tightly around the metatarsal region will answer; and I have sometimes worn a circlet of India-rubber, binding the foot round the instep. Putting on a dry boot and dry stocking is of great benefit, and the boot should be well sprinkled with powdered soapstone before putting it on. Frequently an attack has been relieved completely without other means than rest and a cup of strong tea.”

Morton also reports the following from another medical friend:

“For several years previous to 1864 I had been subject to occasional dislocations of a relaxed joint in the fourth toe of my right foot. They had always occurred in walking, and the symptoms were perfectly distinct; the reduction, which was usually effected without difficulty, by simple ‘working’ the toe, was equally unmistakable.

“In the summer of that year I was climbing a mountain, when the joint became displaced; and, as it would speedily have slipped out again if reduced, I allowed it to remain luxated until I had finished the ascent and returned to the base, when the pain was so great as to make it necessary for me to ride home. After several hours of suffering, the joint gradually resumed its normal state.

“Since that time I do not remember that the luxation has ever taken place; but I have had many attacks of neuralgic pain in the part, coming on generally after exercise, but sometimes after sitting in one position, as in my carriage. Often exercise does not reduce it. Heat, as from the pavements or the sand in summer, is a much more frequent cause. It begins gradually, and sometimes wears away in the same manner, but sometimes vanishes suddenly, as if by magic,

without the use of any means of relief. The pressure of a boot always aggravates it; but it has attacked me while in bed at night. Diversion of the mind will always allay it, but it sometimes comes on again afterward with far greater severity.

"In 1869, while spending most of the summer at Atlantic City, I suffered more from this trouble than ever before or since. It would then often come on at night, after a day in town; and once or twice the attacks lasted more than twenty-four hours. So great was the annoyance from it, that I proposed amputation of the toe to a surgical friend, but he advised me against it. Since then it has been much less troublesome, though I have sometimes had it more or less every day for a month.

"Deep pressure over the metatarso-phalangeal joint is painful, but does not bring on an attack unless long continued. Cold has given me more effectual relief than any other remedy I have tried."

The three following cases are quoted from the same source:

"In March, 1873, I was asked to see Miss H. S., aged twenty-six years, who, while in Europe four years before, had injured her right foot by stepping upon a small stone. She said that she had at once experienced intense pain, which was soon followed by slight swelling and redness. From the date of the injury localized pain in the foot continued, especially while wearing a shoe. The pain was referred to the head of the fourth metatarsal bone. There was constant distress in the part, often of a sickening character. After wearing a shoe, pain came on with great intensity. At such times the shoe had to be instantly removed, the least delay causing a paroxysm of great suffering. The boot or shoe had to be removed so often that a slipper was substituted. A marked lameness was induced by the patient's endeavor to spare the foot in walking. The pain was confined to the joint of the fourth metatarsal bone with the base of the associated phalanx. Pressure in this region, or rolling the fourth and fifth toes upon each other, caused violent pain, which extended up the limb. It was severe when pressure was made upon the base of the first phalanx of the fourth toe, which could be prominently felt between the third and fifth toes."

"Dr. M. W. Allison, of Hagerstown, Md., called on me in the spring of 1875, seeking relief from neuralgia in his right foot, which had existed for years, and was gradually getting worse, and stated that he was willing and ready to submit even to amputation of the leg. He gave the following history:

"About six years ago I experienced an unpleasant, painful sensation in my right foot, which possibly originated in a strain; the pain was first observed in the fourth metatarso-phalangeal region; in the course of a fortnight it was followed by most violent pain, which was simply unbearable, and so severe that it terminated in a convulsion. A painful condition of the parts followed, and with the least provocation (wearing a shoe or boot), sometimes without known cause, paroxysms of intense pain returned at various intervals, lasting from one to forty-eight hours. The pain, with one or two exceptions, has been confined entirely to the section of the foot indicated. My suffering has been beyond all comprehension; very often I have been compelled to jump from my buggy or stop while walking, remove my boot, which has always been of ample size, apply ligatures to the limb or foot, use hypodermic injections of morphia, frictions, or call upon some one to assist me by standing on the foot. This affliction has been the burden of my life, and this burden has been increased after consulting many eminent medical men, who gave me no satisfaction as to the nature of the disease, nor even suggested a hope of relief. My health otherwise has been uniformly good. I am satisfied the cases you have had are similar to my own, save in the intensity of my sufferings, and I shall gladly submit to the operation you have suggested."

Mrs. C. H. K., of this city, a lady fifty years of age, gave me the following history: "'The queer feeling,' I have been accustomed to call it, which has been in my left foot for thirty years, is a painful condition. The pain is in and about the joint of the fourth toe, with occasional attacks of intense suffering, when the pain extends to the knee, and, if my shoe is not instantly removed when the attack comes, the pain reaches the hip. It does not matter whether I wear a large or a small shoe, as I have never worn a tight one, but it seems that the least pressure will produce the same result. Often my sufferings have been exceedingly acute, and come on without any warning. Once I was taken while walking in the street, and the agony was so great that I was compelled to rest on a stoop, remove my shoe, and walk some distance in my stocking alone, the pain running in a straight line to the hip joint. In September, 1868, while at the Academy of Music, I had an unusually severe attack, and, not removing my shoe as quick as I should have done, was obliged to walk to my carriage without the shoe, and suffered intensely for three hours. My eldest sister has been similarly affected still longer than



myself, but in her right foot, same toe and joint. She has several times given up wearing shoes, but the attacks continued."

Charles K. Mills,<sup>1</sup> in a lecture upon "Pain in the Feet," relates the history of a typical case that was entirely relieved by the operation of Morton. A woman, in jumping upon rocks, twisted her foot. The foot apparently was not injured, and she was soon about as usual. During the next two years, at intervals of from two to eight weeks, a peculiar pain in the foot would develop that would last two or three days. Two years later she injured the foot again in the same manner. After this the pain was seldom absent more than a few days, and each recurring attack was of increased violence. Again, two years later, the pain became almost constant. The pain was a dull, heavy, sickening ache, from the foot to the hip, and with a sharp pain through the foot. At times the ache would be limited to the foot, but the sharp pain was there constantly. Arising in the morning, the patient could not put her weight upon the foot until she had taken hold of it suddenly from the top and pressed it hard together, and held it in both hands with all her strength for some minutes. After exhausting every known local and general remedy, the fourth metatarso-phalangeal articulation was excised. The patient subsequently slowly became free of every vestige of the former pain, and was entirely restored to health.

Poullsson<sup>2</sup> describes an instance where a medical man, twenty-nine years of age, had suffered from this affection for some years. It gave no trouble when the foot was at rest and without a shoe, but was usually brought on by wearing boots and walking a good deal. It was much more likely to occur when going down than in going up hill. The pain came on suddenly, a feeling of something having given way in the feet accompanying the onset, together with a kind of grating sensation. After this the patient walked lame, for all pressure of the anterior portion of the sole of the foot to the ground was painful. If walking was persisted in the pain increased, till in a few moments it attained its maximum, rendering all further attempts at locomotion impossible.

Edmund Roughton<sup>3</sup> has reported the following case:

"A medical man, aged thirty-three years, complained that for eighteen months he had suffered from attacks of burning pain in the

<sup>1</sup> Journal Mental and Nervous Diseases, Vol. xv, p. 4.

<sup>2</sup> Loc. cit.

<sup>3</sup> London Lancet, March 16, 1889, p. 553.

forepart of the sole of the left foot. The pain occurred several times a week, and was usually brought on by prolonged standing or by walking any considerable distance, and was so severe as sometimes to cause him to remove his boot and grasp the sole of his foot with his hand. On examining the foot, I found that the transverse arch formed by the heads of the metatarsal bones had sunk, so that a distinct convexity replaced the concavity normally found in this situation.

“ In this case the patient had increased considerably in weight during the period of development of the symptoms, and his transverse metatarsal ligament had presumably been unequal to the increased strain.”

E. H. Bradford<sup>1</sup> has reported a series of thirteen cases, none of which, however, were severe enough to demand operation. In these the symptoms were not in a single instance the result of traumatism, nor was any evidence of dislocation or any local change observable. These patients were all in enjoyment of excellent health, and in none were there evidences of gout or rheumatism.

*Treatment.*—The less severe forms of metatarsalgia may often be prevented from running into the more serious types by proper shoe construction or by wearing a narrow flannel bandage about the ball of the foot. Morton, whose suggestion the latter is, directs that the bandage be two inches wide, and long enough to wrap neatly and firmly about the metatarsus some five or six times. The end is pinned, and the stocking drawn over. This has given marked relief in a number of cases.

The shoes for persons suffering from this disease should be firm-soled, make no lateral pressure upon the metatarsus, yet have the instep tight enough to prevent the foot slipping forward. The great object of the shoemaker should be to prevent pressure, either lateral or antero-posterior, upon the metatarsal arch, and also to prevent any rolling motion of the outer metatarsal heads upon their fellows. A broad, rigid sole would appear to best fulfill this last indication. Bradford proposes the use of digitated stockings in these cases, with a view of keeping the toes further apart. As the foot spreads when the weight of the body is thrown

<sup>1</sup> Loc. cit.

upon the member, it is apparent that the individual should be standing when the measurements for shoes are made, as has been advised by Grün.

The use of various pads in the shoe and about the toes, also such measures as the hollowing out of cavities in the sole opposite one or more of the metatarsal heads have been tried, but invariably found unsatisfactory. A variety of the affection calling for so much attention to secure comfort would clearly demand the certain cure to be afforded by operation.

In persons where rheumatic or gouty diathesis may be suspected, appropriate remedies for those disorders should be given a thorough trial before operative measures are resorted to. But when the condition is entirely of local mechanical origin, the employment of general or local medicinal agents is useless. On the other hand, prolonged rest in bed will benefit all cases more or less, and occasionally secure relief for long periods, or even permanently cure the milder phases of the disorder.

Operative treatment should be limited to excision of the metatarso-phalangeal articulation from which the neuralgia radiates, or, perhaps, to amputation of the corresponding toe above the joint, as have been recommended by Morton and endorsed by other writers. These procedures are among the safest and simplest in surgery. Of amputation of the toe, together with its metatarsal head, nothing more need be said than that by this measure the possibility of subsequent trouble arising from a tendency of the toe to retract and ride above or below its fellows is excluded. However, this heretofore occasionally troublesome sequel can be avoided by dividing the extensor and flexor tendons while excising the joint, as I have done in five cases with most satisfactory results.

*Operation.*—Primary union should be aimed at. To secure this the foot must be scrupulously cleansed. The nails should be trimmed short. Then soap, water and nail-brush should be liberally applied. Following this, the member should be soaked in 2½ per cent. carbolic acid solution, and finally dressed in a moist carbolic dressing of the same strength until the surgeon is about to operate. Where the foot is especially foul it is my

custom to finally dip it into a saturated solution of permanganate of potash until colored to a dark mahogany hue, and then transfer it to a saturated solution of oxalic acid until decolorized, before applying the temporary dressing. When the surgeon is about to operate, the temporary dressing is removed and the parts given a final douche with 1 : 1000 sublimate solution.

A vertical incision from one and a half to two inches long is made, beginning over the proximal inter-phalangeal joint and extending upward in the centre line of the toe.<sup>1</sup> The extensor tendon now comes into view, and is divided. Another stroke of the knife carries the incision through its entire length down to the bone. The handle of the knife or other moderately blunt implement is then employed to separate the tissues from the upper and lateral portions of the joint. Next the blades of a powerful sharp-pointed, narrow-bladed cutting pliers are pushed down on either side of the phalanx immediately below its base (hollow of the blades always toward the articulation), and this bone divided. The metatarsal bone is then similarly divided just above its head. The separated joint is now seized by bone forceps and dissected away from any remaining attachments. This done, the flexor tendons will be seen lying in the bottom of the wound, and should be picked up by forceps and divided with scissors. If hæmorrhage is severe and not controllable by moderate compression of the parts, ligatures should be applied. I have never had occasion to apply a ligature in this operation, as the pressure of the dressing has always sufficed to control any oozing that might continue after the sutures had been applied. The wounded edges are next to be approximated—no drainage being required if asepsis has been maintained—by continuous or interrupted suture, as may be preferred. A gauze and cotton dressing is finally applied and bound firmly on with a wet gauze roller, care being observed to place little pads of the gauze in such positions as will hold the toe in its proper position during healing.

The foot should be kept considerably elevated for the first two days, after which it may be brought to the level of the bed.

<sup>1</sup> This joint has also been excised through an incision in the sole, but the method is objectionable on many grounds.

I prefer my cases to remain in bed or on a couch until the fourth or fifth day, when they may be permitted to sit up with the foot resting on a chair. At the end of a week the sutures are removed; two or three days after which the patient is permitted to move cautiously around, while at the termination of three weeks all restraint may be removed and a firmly healed wound and permanent cure confidently expected. No special form of shoe or particular care of the foot is afterward required.

In case suppuration should arise in the wound the sutures should be at once removed, the wound cavity washed out with full strength peroxide of hydrogen solution, then with 1 : 1000 corrosive sublimate solution, and gently stuffed with iodoform gauze. All of which should be repeated every one or two days until the wound closes by granulation.

In addition to the references given in the text the following may be mentioned to complete the bibliography of the subject :

Gross: System of Surgery.

Agnew's Surgery.

Erskine Mason: American Journal Medical Sciences, October, 1877.

Editorial, New York Medical Journal, October 8, 1892: Morton's Painful Affection of the Foot.

Roswell Park: Medical News, 1892, Vol. 11, p. 406, Morton's Affection of the Foot.

Meade C. Kemper: Virginia Medical Monthly, Vol. VIII, p. 522, Case of Metatarsal Neuralgia.

# TRANSACTIONS OF THE NEW YORK SURGICAL SOCIETY.

*Stated Meeting, March 22, 1893.*

The President, ARPAD G. GERSTER, in the Chair.

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## A CASE OF ACROMEGALY.

Dr. F. W. MURRAY presented a man who was the subject of acromegalic disease, having the following history :

J. M., sixty-seven years of age, widower, laborer, born in Ireland. His father died at forty years of age of pneumonia, his mother at sixty from causes unknown to him. He had three sisters and a brother. The sisters were of medium size and all died in adult life, one after childbirth, the others from causes unknown. The brother was a large, powerful man, and when last seen was in good health. The father was of average size, while the mother was a large, stout woman. Patient is the father of twelve children, all boys, ten of whom died in infancy. The two remaining sons are healthy men, and patient states that they are in no way peculiar in appearance. During childhood he had measles and scarlet fever, but since then he has enjoyed perfect health. As a young man he was short, stout and very muscular, and could do any amount of hard work. He was always of a cheerful disposition and was never depressed. No history of syphilis, tuberculosis or rheumatism. Twenty-five years ago he was struck on top of the head by an iron bolt and received a scalp wound, but the injury was not sufficient to lay him up. As to the time when his face, hands and feet commenced to enlarge, there is no definite history. All that he remembers is that above twenty years ago his friends called his attention to the size of his hands. Three years ago his left eye was injured so seriously as to require its removal. Up to four years ago he was able to do regular laboring work, but since then he has worked only at intervals. The appearances of the face and hands, as seen in the photographs, are characteristic of the disease. The face is oval and elongated, the supra-

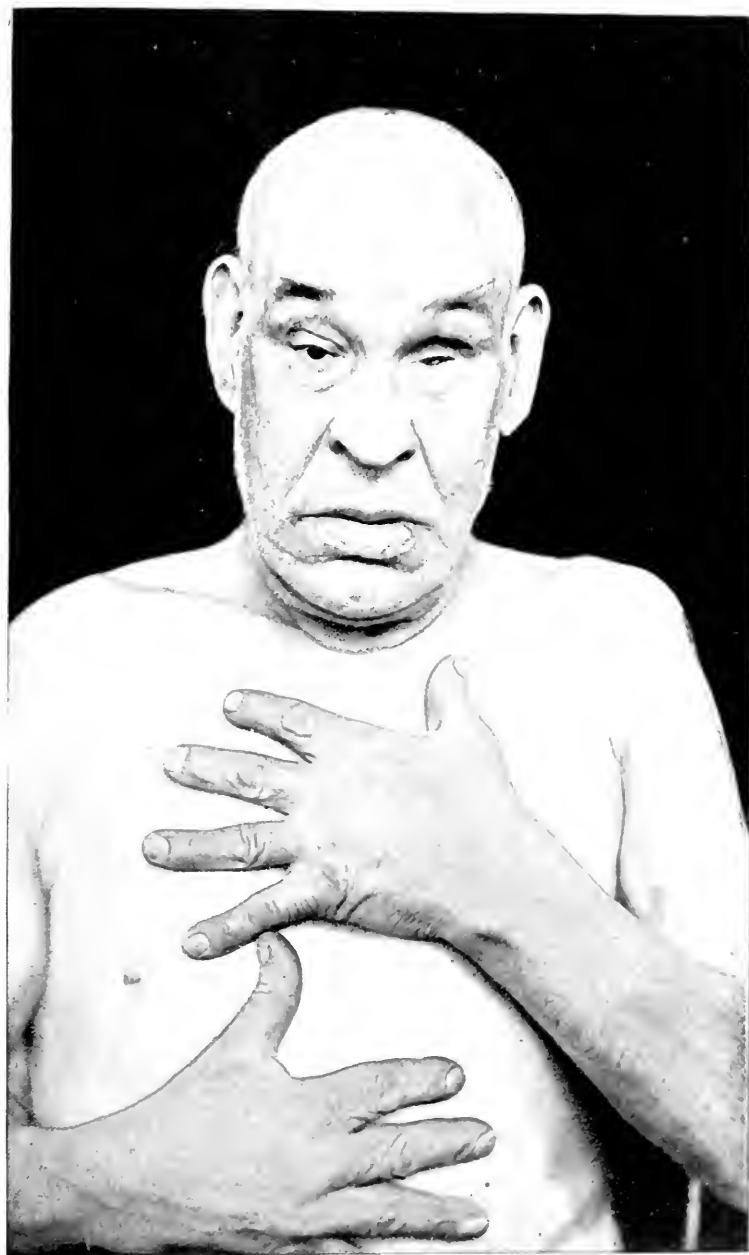


FIG. 1.—Dr. Murray's case of Acromegaly—Present condition





orbital ridges very prominent, the malar bones, the nose, the ears and the lower jaw are enormously hypertrophied. The large mouth, the thick lips and the deep chin are very noticeable. The lower jaw projects greatly in advance of the upper, and most of the teeth are lost. The skin of the face is rather pale, but the mucous membrane is of normal color. The tongue is greatly hypertrophied, and on its dorsum are many deep furrows. The hands are broad and thick and present the spade-like appearance. The fingers are short, thick and "sausage-shaped," the nails flat, broad, with brittle edges and with well-marked longitudinal striations. The wrists are enlarged, and the lower ends of the radius and ulna are considerably hypertrophied. The feet are uniformly enlarged, and one notices the prominent heel, the size of the great toe and the thickness of the soft parts on the outer side of the foot. The bones of the chest are all enlarged, while the ensiform cartilage is bent upward and forward to such an extent as to make a decided prominence.

The following measures were taken :

	Right. Inches.	Left. Inches.
Length of hand . . . . .	8 $\frac{3}{4}$	8 $\frac{1}{2}$
Circumference of hand at knuckles . . . . .	10 $\frac{1}{4}$	10
Circumference of index finger, proximal phalanx . . . . .	3 $\frac{3}{4}$	3 $\frac{3}{4}$
Circumference of wrists . . . . .	8 $\frac{5}{8}$	8 $\frac{1}{2}$
Circumference of forearm, upper third . . . . .	11 $\frac{1}{4}$	11
Circumference of arm . . . . .	11	10 $\frac{1}{4}$
Length of foot . . . . .	10 $\frac{1}{2}$	10 $\frac{1}{4}$
Circumference of foot across heel and instep . . . . .	14 $\frac{3}{4}$	14 $\frac{1}{2}$
Circumference of great toe . . . . .	4 $\frac{1}{8}$	4
Circumference of calf of leg . . . . .	14 $\frac{1}{2}$	14 $\frac{1}{4}$
Length of nose . . . . .	2 $\frac{3}{8}$	
Naso-facial junction to mouth . . . . .	1 $\frac{1}{8}$	
Depth of chin . . . . .	2 $\frac{1}{2}$	
From zygoma to zygoma . . . . .	6	
Length of ears . . . . .	3 $\frac{1}{2}$	
Width of mouth . . . . .	3	
Circumference of neck . . . . .	17	
Circumference of chest at nipple (expiration) . . . . .	42 $\frac{1}{2}$	
Circumference of abdomen . . . . .	40	

Patient is five feet eight inches in height and weighs 208 pounds. At forty years of age weight was 245 pounds. No enlargement of the thyroid gland and no dulness on percussion over upper part of

sternum. Eyesight apparently normal (no ophthalmological examination made), hearing somewhat impaired, and the voice is rough and husky.

Some cervico-dorsal kyphosis. Varicose condition of legs well-marked. Urine negative.

Patient does not suffer from headache, perspires very freely at times, is often drowsy and complains of general weakness. He is of a cheerful disposition and, considering his age, his general condition may be said to be fair.

Examination of blood by Dr. T. S. Southworth:

“ Fresh specimen. Red cells vary considerably in size, many small and shadow cells on outside of specimen, no macrocytes, rouleau formation fair. cells rather poor in color and of poor resistance.

Hæmoglobin, 78 per cent.

Red cells, 4.848.000.

White cells, 5400.

Ehrlicht stains—lymphocytes, 50 per cent.

Large mono-nuclear leucocytes, transition form, 3 per cent.

Polynuclear leucocytes, 44 per cent.

Eosinophile cells, 2 per cent.

There is nothing characteristic in the blood beyond the irregular size of the red cells. The increase of the ‘lymphocytes’ (normal 25 per cent.) is interesting if it shows in other cases.”

While this patient may be said to be a well-marked example of acromegaly, still, in comparison with the reported cases of this disease, he presents no unusual features. As regards his surgical history, there are one or two points worthy of mention. First, as to the cause of the suppurative periostitis. The site of the abscess was the same as that of the injury received twenty-five years ago from the iron bolt. As there is no history of recent traumatism, and as the other ætiological factors of abscess in this region are absent, one queries whether it is a mere coincidence, or whether there is some relation between the remote injury and the recent suppuration. In order to bring about a rapid healing of the abscess, I made use of a method which has been successful in my hands in other cases. The abscess cavity was freely exposed by a crucial incision, with a Volkmann's spoon the granulating surface of the pericranium was thoroughly removed and then the surface of the exposed bone was “scarified” with a chisel. The scarifications consisted of removing

at frequent intervals small and very thin pieces of the outer table of the skull, and thus the abscess cavity was converted into a fresh wound. After thoroughly irrigating the cavity with sterilized water, the edges of the incision were united by sutures and a sterilized dressing applied over all.

Union per primam followed.

## TREPHINING AND DRAINAGE OF THE LATERAL VENTRICLES.

Dr. A. J. McCosh presented a patient, male, aged twenty-nine years, who since the age of eighteen had had occasional attacks of epileptic convulsions, beginning with pain in the region of the heart, and becoming general.

In last October he received an injury to his head, and was brought to the Presbyterian Hospital in a semi comatose condition. He remained in a stupid, semi-delirious state for several weeks, and then gradually his mental state improved, and he was able to leave the hospital on December 17. During his stay he had a number of general convulsions. On his second entrance, on January 4, he averaged one convulsion a day, but was at all times stupid, and his mind often wandered. The fits became more frequent and his stupidity increased until in the end of January he was averaging five convulsions in the twenty-four hours, and was quite irrational. When on January 28 he was transferred to the service of Dr. McCosh he was in a very bad mental and physical state. He was at no time rational, for part of the day he would lie in a semi-comatose condition, and at other times would be seized with delirium rather of a muttering character. He refused all nourishment, and needed to be constantly watched.

He was very hyperæsthetic over his whole body, but especially so on the back of his head and most markedly at the seat of a linear cicatrix of the scalp, on the right side of the occiput. His tendon reflexes were enormously exaggerated. He was seen by several surgeons and neurologists, and their diagnoses inclined toward syphilitic gumma or general paresis. February 2 he was subjected to operation as follows: A flap of scalp was raised, the cicatrix being in its centre. On exposing the bone a cicatrix and roughening was found under the scalp scar. With a trephine a button of bone was removed just above the lateral sinus on the right half of the occipital

bone. The inner surface was found roughened but not depressed, the projection being about one-tenth of an inch below the under surface of the bone. The dura was found thickened and roughened over a space three-quarters inch square, being perhaps twice as thick as normal. A flap of dura was raised and no clot found. The pia and brain looked normal. A great amount of intra-cranial pressure was noticed, the brain bulging. To reduce this a medium-sized aspirating needle was thrust into the lateral ventricle, and three ounces of fluid were removed. The fluid continued to escape at the rate of one drop every five seconds. The dura and skin were sutured, and a tube was left in the ventricle for thirty-six hours. He has had no fit since, and has been perfectly well for a month. A number of neurologists have also seen the patient since the operation, and all have been at a loss to account for the improvement and apparent cure.

### EXCISION OF THE ELBOW.

Dr. R. H. M. DAWBARN presented a young man who had fallen from a height last September, striking his arm, and was treated for fracture in a hospital out of town. When he saw him, ten weeks ago, there was complete bony ankylosis at the elbow, at a slightly obtuse angle, or nearly a right angle, and the hand could not be made to approach the mouth nearer than twelve inches, so Langenbeck's excision was done. The reason for showing the patient is that a suggestion made in this Society not many months ago by the President, Dr. Gerster, for the purpose of preventing over-extension by absolute loss of the olecranon following excision, was carried out in this case. The olecranon and lower end of the humerus were fused together in one solid mass, and a large callus existed on either side of and including the former, so that it was impossible to discover anything as to the exact seat of the previous line of fracture. The humerus was sawed across two inches above its lower end, and then, partly by chisel, partly by saw, an olecranon process was shaped from the mass and left attached to the ulna. It was impossible to say how nearly this piece corresponded in shape to the original olecranon. At any rate, the object sought, the avoidance of over-extension, has been accomplished. An apparatus was worn rather longer than customary. Active and passive motion were practiced once a day, beginning at the end of the first week, twice a day toward the end of the second week, then a number of times a day, being careful to carry out the normal

motions. He now, without assistance, can touch his mouth. Extension is nearly complete ( $15^{\circ}$  short); and pronation and supination are very fair.

The apparatus used was striking in its simplicity, ease of application and cheapness. It consisted of two narrow pieces of iron barrel hoop, each nearly a foot long and two-thirds inch wide, clamped together at one of their ends by a thumb-screw, or better, a small hand-vice, to be bought at any hardware store. The blacksmith formed a rectangular bend, to permit of passage of dressings and bandages beneath, when dressing the elbow. The longer ends of these two iron strips were incorporated in gypsum splints, running respectively from the shoulder down to the dressing, and from the hand up to the dressing. The strips arched above the dressing on the outer side of the elbow, and where they overlapped each other, were clamped by the hand-vice. After each exercise of passive motion they were clamped at a fresh angle, one differing from the last. The device cost only sixty cents, but nevertheless fulfilled the conditions perfectly.

#### SEVERE PHARYNGEAL STENOSIS FROM SYPHILIS RELIEVED BY OPERATION AFTER TRACHEOTOMY.

Dr. CHARLES K. BRIDGON presented the following case: Julia B., aged 37, contracted syphilis from her husband six years ago. She was brought into the Surgical Division of the Presbyterian Hospital from the out-door department, suffering such urgent dyspnoea that only a cursory examination of the throat was made, under the local influence of cocaine a tracheotomy being performed which gave immediate relief to her distress, and it was found that the laryngeal symptoms were probably due to obstruction above the glottis. This, however, was conjectural, as exploration of that part was not possible. The trouble in breathing had begun three years ago, and had gradually increased up to the present time; *pari-passu* with this there had been great trouble in swallowing. Until now she could only swallow fluids, and repeated careful examinations made it difficult to believe she could take enough to sustain life.

On examination, the uvula and palatine arches were found fused together in a mass of cicatricial tissue that separated the naso-pharynx from the buccal and the cavity of the inferior pharynx. These were

not of the nature of a simple diaphragm, but a dense, solid resisting mass that conveyed the impression that above and below was an unyielding mass of new tissue. Just below the junction of the soft and hard palate was an oval aperture about a quarter of an inch in diameter that led from the cavity of the mouth to the naso-pharynx, but which did not communicate with the inferior pharynx. Behind, or at the base of the tongue in the middle line, were two small bands, between which was an aperture just admitting a No. 15 French bougie, and through this she had taken enough food and air to sustain life. For the relief of this condition the patient was subjected to the following operation, January 27: Having been placed in the sitting posture in front of a good light, and immediately in front of the operator, a few drops of a 4 per cent. solution of cocaine were injected into the tissues along the proposed lines of incision. It was difficult to introduce the canula of the syringe into the parts on account of their dense nature, and it was doubtful whether the local anæsthetic effects amounted to anything. The palato-glossi on either side were severed from the base of the tongue with strong long scissors, curved on the flat, the separation being continued until all the dense bands were divided and the finger detected the softer structures beyond. Then a free incision was made along the median line from the opening that led into the naso-pharynx through into the small aperture that communicated with the larynx below. This was made carefully in the midline, and as far back as the vertebra behind. After some time a cavity was opened just above the glottis, and the remains of the epiglottis could be made out—a stump apparently of about a quarter of an inch in length. The posterior wall of this cavity was then divided and opened into the termination of the naso-pharynx. Everything appeared to be now divided down to a level with the superior limit of the cricoid cartilage, which could be made out by the middle and index finger carried down as far as possible. But it was also determined that the limit of the contraction was not passed, and a further dissection was made by variously curved long scissors, guarded by the fingers of the left hand, and after some time it was possible to pass a large, soft rectal bougie fairly down and into the œsophagus beyond. There had been very little hæmorrhage. No tampon was used, the patient being directed only to use an antiseptic gargle freely, and for a few days she was sustained by rectal enemata.

The after-treatment was very simple. Within a week the systematic use of the large bougie was instituted and the patient, who was

a woman of unusual courage and intelligence, soon became quite expert, passing a soft rubber rectal bougie, six centimetres in circumference, night and morning.

On March 16 the canula was removed from the trachea, the bougies passing with increasing facility four or five times a day, and the patient was ready to leave the hospital.

### THE COMPLICATIONS OF CHOLELITHIASIS.

Dr. C. T. PARKER read the paper of the evening on "The Complications of Cholelithiasis." (See page 639.)

Dr. B. F. CURTIS referred to two cases which were of interest because of the uncertainty of diagnosis. One was a case of acute attack of gall stones, inflammation of the gall bladder and threatened peritonitis, mistaken for perityphlitic abscess. The liver was displaced forward, so that liver dulness extended more than a hand's breadth below the free border of the ribs, while below that a tumor could be felt, which was intensely tender to the touch. Dr. Curtis saw the patient for the first time while she was under ether, and even then, owing to tension of the abdominal walls, it was impossible to make out anything more definite. The patient had been sent to the hospital with the diagnosis of perityphlitic abscess. The dulness along the free border of the ribs was supposed to be due to accumulation of feces in the colon. Incision, however, revealed that the supposed perityphlitic abscess was a distended gall bladder. The liver was not enlarged, but was dislocated forward, so that the edge lay a hand's breadth below the free border of the ribs.

The other case was one of pyloric obstruction with a curious tumor in the region of the gall bladder. Several eminent physicians had seen the patient, and were agreed upon the presence of pyloric obstruction, but they differed in opinion as to the nature of the tumor in the region of the gall bladder, some suggesting that it was cancer of the gall bladder, others that it was a distended gall bladder; others that it was cancer of the large intestine, and so on. The laparotomy showed that the right lobe of the liver was cirrhotic, and had shrunk away so that the normal left lobe had been drawn over to the right of the median line, projecting below the edge of the ribs and simulating tumor of the gall bladder.

These cases show some of the difficulties of diagnosis in abdominal surgery. He did not think that any hard and fast rules could be laid down; we must always feel a certain amount of doubt

as to the nature of a supposed tumor in the abdomen. The diagnosis of tumors of the kidney has lately excited a good deal of interest, and it has been found that tumors of the gall bladder and of the intestine may give the same sensation of "ballotement" as do the kidneys.

### EARLY RECURRENCE FOLLOWING EXCISION OF MALIGNANT DISEASE.

Dr. CURTIS, for the purpose of introducing for discussion the subject of early recurrence in certain cases of malignant disease, reported two recent cases. One was that of an elderly man with a tumor of the mucous surface of the cheek. It was pedunculated to a certain extent, and sprung out like a cauliflower growth, and while not looking exactly like an epithelioma, yet that diagnosis seemed the most probable one. It was excised very freely, fully a quarter of an inch away from the edge of the growth on all sides. The pathologist reported that it was a spindle-celled sarcoma. The wound did very nicely, but within two weeks of the operation there suddenly appeared on the mucous membrane, fully half an inch distant from the line of incision, and where it had appeared to be perfectly healthy, another new growth, which within a week attained the size of the tip of one's little finger. A more extensive operation was done, but it is too early to report the final result.

At about the same time he removed a cancerous tongue by scissors through the mouth, there being absolutely no glandular enlargement anywhere to be felt. In removing the tongue he went back fully half an inch beyond the slightest appearance of new growth. The mucous membrane on the anterior pillar of the tonsil of that side was also drawn out and cut away. The edges of the mucous membrane were sutured, and primary union was obtained over the greater part of the wound. He was sorry to say that now, three weeks after the operation, evidently epitheliomatous growth has made its presence at one spot on the edges of the wound.

These cases are very disheartening, and he would like an opinion expressed as to how far from the growth one should go in such operations. In the first case, for instance, there was no more reason to suspect that the mucous membrane afterward involved was the seat of disease, or that it would be the site of recurrence than that of any other part of the mouth.

Dr. DAWBARN said that in view of the remarks made by Dr. Cur-



tis it might be well to refer to the nitric acid test, which is used more or less on the Continent and in some cities in this country, but not in New York, as far as he knew. By immersing the excised cancer or epithelioma in a weak solution of nitric acid—5 or 10 per cent.—one can tell in a few minutes whether he has cut quite beyond the area of disease. If any focus of disease exists in the apparently normal border it will become opaque, while the healthy tissue will be rendered semi-translucent.

He had been struck by the fact that in some recent discussions certain good men have taken a strong position in favor of caustics instead of the knife in some cases of cancer or epithelioma, the advantage claimed being that the inflammatory reaction caused by the caustic paste destroys possible outlying diseased cells which would not be reached by the knife. This attitude had appeared the more striking to him because he had been brought up with the idea that it savored of quackery to use caustics in the treatment of malignant growths.

In this connection it might be proper to mention a line of work recently taken up by his friend Dr. W. F. Arnold, of the Navy, who has recently been given time in which to make original experiments in the laboratory in Brooklyn. Briefly, the study relates to the destructive effect upon low organisms and cells of light deprived of its heat. For instance, light passing through an alum solution, thus being deprived of its heat rays, is focused by a burning-glass upon the flesh, and in a few minutes will produce a slough while causing almost no pain. This method might be employed for destroying a cancerous structure close to the eye or other part where the knife could not efficiently be used, and where it would be dangerous to employ a destructive paste because of inability to limit exactly its caustic effects.

The President, Dr. GERSTER, said that about ten years ago in a paper read before this Society he had laid stress upon the fact that very often a malignant growth, usually cancer, which operation, sometimes proving fatal a very short time afterward, had been of slow development, shows rapid dissemination after. He was inclined to believe that the very act of the operation had something to do with it. He still believed that the manipulations in excising the tumor are a cause of the rapid springing up of foci of disease in the neighborhood, but not in close proximity to the site of the original tumor, especially in cases where the surgeon has given the disease a wide birth. The dissemination seems analogous to that which has been proven to take place in some instances of tubercular

disease. There is no doubt but that there have been cases of operative dissemination of tubercular disease, although at first it was doubted. Especially in children do we sometimes see rapid miliary tuberculosis develop after an operation for joint tuberculosis. The nitric acid test mentioned by Dr. Dawbarn would be of no value, for the infiltration of particles of microscopic size would be as likely to cause renewed disease as larger ones.

He had no doubt that in many cases of rapid recurrence, especially if it takes place in the margin of the wound itself, the so-called recurrence is not a recurrence at all, but a direct continuation of the process, which was not radically stopped by extirpation. Some remnants of cancerous material must have been left, and afterward they simply proceeded to sprout and manifest themselves. But these do not belong exactly to the class of cases to which he referred, of which the first case mentioned by Dr. Curtis was an example.

Dr. DAWBARN did not wish personally to advocate the nitric acid test, for he had not used it, but those who have employed it, and who like it, say that foci are made to manifest themselves if present in the parts of the tumor removed, which, without such test, appear perfectly healthy, and when that happens the surgeon cuts considerably wider than he had previously done.

Dr. KAMMERER considered that the analogy between miliary tuberculosis following operations upon tubercular joints and the recurrence of malignant disease after operations, hardly applied in the case related by Dr. Curtis. We have all seen miliary tuberculosis follow joint operations, due, he presumed, to dissemination of the tubercular poison and the immediate result of operative interference. We have also seen removal of cancer, say of the breast, followed by rapid dissemination or appearance of cancer elsewhere, in the liver, in the body of the vertebra, in the femur, etc. But Dr. Curtis was not referring to that class of cases, but rather to those in which there is a local recurrence due, as he believed, in almost all cases, to imperfect removal of the original disease. He did not think it would be possible to lay down positive rules as to the distance we should always go beyond the line of apparent disease. If Dr. Curtis went a quarter of an inch into seemingly healthy tissue, he thought it was all that could be done.

Dr. CURTIS remarked that there is a practical point connected with the theory suggested by Dr. Gerster. If there be simply a recurrence from infection of the edge of the wound, we can hope to cure the case by a slight further operation, and he thought clinical experience tended to bear out that view.

# TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY.

*Stated Meeting, March 6, 1893.*

The President, Dr. WILLIAM HUNT, in the Chair.

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## AMPUTATION AT HIP JOINT FOR OSTEOMYELITIS.

Dr. JOHN B. DEEVER presented a case of amputation at the hip joint, done for osteomyelitis of the femur. At the time of the operation the patient was very much depressed from sepsis, consequent upon prolonged suppuration. During the amputation hæmorrhage was controlled simply by an Esmarch tube applied round the thigh, above the trochanter and along the crease of the groin, being retained here by two pieces of bandage, one passed beneath the tube in front and the other beneath the tube behind, each of which was held by an assistant. An oval flap of skin and fascia was made, and the muscles divided down to the bone by a circular sweep of the knife. The superficial and deep femoral arteries, with their accompanying veins, were next tied separately, as well as those of the muscular branches which could be recognized. The tube was next loosened a little, and the small vessels, as they bled, caught with hæmostats. The tube was now removed, and an incision carried from the external angle of the wound up over the trochanter and into the joint, dividing the capsular ligament, when the muscles were carefully separated from the bone and disarticulation completed. The amount of blood lost amounted to not more than two ounces. The advantage this procedure offers over the Wyeth method is in not dividing the femur before the disarticulation is made, and further, that the amount of blood lost is not any greater, and the vessels not being constricted for so long a time, there is less likelihood of consecutive bleeding.

## INVETERATE NEURALGIA OF THE TRIFACIAL NERVE; COMPARATIVE VALUE OF OPERATIVE METHODS FOR ITS RELIEF.

Dr. JOHN B. DEEVER also presented specimens from a patient, a man, fifty-eight years of age, who at the age of thirty-four was first

attacked with neuralgia of the inferior dental nerve, which had followed the healing of a chronic sinus communicating with the right inferior maxilla. This pain continued at irregular intervals for six years, when he consulted a surgeon, who was supposed to have removed a section of the nerve near the dental foramen. Very little, if any, relief followed this operation, when a second was performed by the same surgeon one year later; this was followed by relief for one year, when he had another attack of the pain. He now came under Dr. Deaver's care, who trephined the inferior maxilla over the angle and removed a section of the inferior dental nerve. This was followed by relief for a period of fifteen months, when the pain again returned. He now opened up the field of the old operation, exposed the proximal end (stump) of the nerve, excised a part therefrom, chiseled away the roof of the remaining portion of the dental canal, and removed the distal portion of the nerve as far as the mental foramen. This was followed by relief for sixteen months, when the pain returned, being referred, in addition to along the course of the inferior dental, along the side of the tongue. He now simply cleared out the field of the old operation, but this was not followed by any marked relief. He again operated, this time taking out a vertical section of the ramus of the jaw as far as the sigmoid notch, and removed a further section from the proximal end of the inferior dental, and at the same time a section from the gustatory nerve. This was followed by relief. He purposely refrained from taking a section from the inferior maxillary nerve immediately after it passes through the foramen ovale, also from performing an intracranial operation, not being convinced that these more radical procedures are warrantable until the milder ones have been done without success. He recalled a number of cases, both of neuralgia of the inferior as well as of the superior maxillary nerve, where he had followed the course adopted in the present case in relapsing attacks, with such satisfactory results, that he was convinced that a longer period of relief from pain is offered the patient thereby than would result, perhaps, by the more radical operations.

Dr. J. E. MEARS said that in one case he had removed two and one-half inches of nerve and submitted it to Dr. DeSchweinitz for examination, and the condition found was that of fatty degeneration. It seemed to him important that study should be directed toward ascertaining, if possible, what the pathological condition is in these cases of trifacial neuralgia; operative procedures appear in most cases to be hopeless so far as permanent relief is concerned.

Last spring the members of the American Surgical Association were shown in the Massachusetts General Hospital the results in five or six cases of operations upon the second and third divisions of the fifth nerve for neuralgia. In these cases an incision had been made over the temporal region, the muscle cut through and the zygoma divided. By pressing the tissues down firmly the operator was able to reach the second and third divisions as they emerge from the foramen rotundum and ovale. In these cases the relief had extended, he believed, over three or four years, and in one case five or six years.

If the disease is of central origin no operation on the peripheral terminations of the nerves can be of service. Repeated operations give temporary relief.

Dr. W. W. KEEN quite agreed with Dr. Mears that the question of the pathology is a most important one. In the cases where he had had microscopical examinations made the change had been found to be one of sclerosis. In one case there were spots of distinct hæmorrhage into the nerve. These were almost microscopic. He had never seen the inferior dental nerve so large as it was in this case. That patient had a return of the pain, and a second operation was done. So far as he could determine, a new nerve had formed, and, strange to say, there was a branch of this nerve which went inward through a foramen on the inner surface of the jaw, which foramen he had not seen at the first operation. Dr. DANA some time ago published a paper in which he stated that he had found sclerosis of the vessels rather than of the nerve. However this may be, it seemed to him clear that the sclerosis of the vessels or of the nerve is the chief thing, and that this is distinctly a senile change. It does not appear in early life, but only in later life, when sclerosis of other organs appears. This being the case, the operation of choice should always be the peripheral operation. He would not think of endeavoring to remove or break up the Gasserian ganglion as a primary operation. He had been told recently that one of Mr. Rose's cases had shown symptoms of return, and this is what might be expected, as the sclerosis begins rather in the periphery and works backward. While medicine offers no benefit in the majority of cases, as a rule the patient may be assured that an operation will afford at least one or two years of relief. He presumed that some of Dr. Deaver's operations consisted simply in reaming out the connective tissue about the stump of the nerve. This Dr. Keen had done in more

than one case, and, although under the microscope no nervous tissue could be found in the material removed, the operation gave as much relief as followed a pure exsection of the nerve. This being the case, it seemed to him that surgeons should, as a general rule, endeavor to give relief by such a simple operation, rather than immediately to go to the foramen rotundum or ovale or within the skull and remove the Gasserian ganglion.

Dr. Deaver had referred to destruction of the ganglion as not a serious operation. Dr. Keen considered it quite a serious operation, although there have not been a large number of deaths. Rose has done it six or seven times, with one or two deaths. Andrews four times without a death. Hartley once with recovery and Dr. Roberts once with recovery. Besides this, two eyes, and possibly more, have been destroyed. Any operation involving so much traumatism is to be considered a very serious operation, and should not be undertaken except after the gravest consideration.

Dr. JAMES M. BARTON called attention to cases in which small aneurisms had been found in the diseased nerves. The results of the ligation of the external carotid for this affection lend support to the presumable frequency of such a pathological condition in neuralgias. Nussbaum claimed that one-half of the cases are permanently cured.

He also confirmed what had been said by Dr. Keen. The most trifling operation on the nerve, the slightest stretching, even the division of the distal branches, is apt to afford temporary relief, and the most serious operation will not do much more.

So rare, in his experience, had anything like permanent relief followed operations, that he had exhibited before the Society a few months before as something unusual, a case of neuralgia of the second branch, of thirteen years duration, in which after removal of the nerve at the foramen rotundum relief had continued for five years, the man being still free from the disease.

Dr. THOMAS G. MORTON said that he was at present attending a patient, who is now eighty-two years of age, on whom he had operated some twenty years ago. After the excision he had entire relief for many years; then had a recurrence of pain, brought on apparently by a ride of five miles in a wagon which had no springs, in which he was severely jolted.

For the last ten or fifteen years, although enjoying, indeed, robust health, he has at times suffered intensely, and then, again, having entire immunity from pain. Now the suffering is only relieved

by morphine injections. Swallowing, talking, any movement of the tongue, touching the skin of the face, or even the beard, provokes "thrusts of pain."

In another case—now more than twenty years since the operation—the patient has had entire freedom from pain. As a rule, sooner or later pain reappears; but in such cases there is no reason why the operation should not be repeated. Benefit is generally experienced from each operation, and for even a measure of relief patients are willing to submit to any treatment.

### FRACTURE OF THE THYROID CARTILAGE.

Dr. WILLIAM J. TAYLOR reported a case of fracture of the thyroid cartilage. The patient, Charles E., aged forty-three years, was admitted to the surgical ward of St. Agnes Hospital on October 6, 1892, in a semi-conscious condition, having fallen a distance of about twenty feet from a scaffold upon which he had been working. No one saw him fall, but when he was discovered he was unconscious and lying across a heavy piece of wood. He was very much shocked. The right side of his face was badly contused, the right eye closed. He was bleeding from the nose, mouth and left ear, and his general appearance was that of a man suffering from a fracture of the base of the skull. The pupils were equal, and a very careful examination showed this diagnosis to be an error. He had great difficulty in breathing, could not swallow, the saliva ran out of the corners of his mouth, and when he attempted to speak his voice was husky and his articulation very indistinct; he could not speak above a whisper, and only that with the greatest pain and difficulty. There was little or no swelling of the neck, but when he regained complete consciousness he complained of great pain and discomfort in the throat.

A careful examination now revealed a fracture of the thyroid cartilage on the right side, extending from above downward about on a line with the insertion of the thyro-hyoid muscle and about two lines anterior to it. The amount of displacement was very slight, but the mobility of the fragments could be easily demonstrated and the fragments displaced and replaced again by manipulation with the fingers.

There was also a rupture of the tympanic membrane about at the extremity of the manubrium process of the malleus. The nose showed hæmorrhagic points on the septum on both sides.

Dyspnoea was pronounced, but there was apparently no emphysema about the seat of the fracture or in the neck. His symptoms were severe and the pain and discomfort very great, but not so great as to demand immediate operative relief. No attempt whatever was made to apply a dressing. For some days the bleeding from the mouth persisted, and the difficulty in swallowing and dyspnoea continued, but gradually lessened and by the end of three weeks was entirely gone. His voice still remained somewhat husky, but there was no longer pain or difficulty in swallowing. The left ear was treated by cleaning out the auditory canal with cotton and insufflating daily aristol and boric acid.

The President, Dr. HUNT, remarked that he had studied the subject of fractures of the thyroid cartilage some years ago, and his conclusions then were that in cases in which emphysema and bloody sputa were present there had been up to that time no recovery where tracheotomy had not been performed. He thought that tracheotomy should be done when the first symptoms were discovered. He found several cases similar to that reported by Dr. Taylor in which recovery followed without tracheotomy.

#### MULTIPLE FRACTURES OF BONES.

Dr. TAYLOR reported the following case: A woman, aged fifty-six, was admitted to St. Agnes' Hospital on the evening of October 19, 1892, suffering from multiple fractures of both upper extremities. She was going down a cellar stairway in the dark when she missed her footing and fell to the bottom, some eight or ten steps.

Upon examination it was found that she had received a lacerated wound of the scalp, six inches long, and extending down to the bone, and a deep lacerated wound of the lower lip about two inches in length. There was a fracture of the surgical neck of the left humerus, and an oblique fracture of the middle one-third of its shaft; a contusion of the left elbow, and a fracture of the lower end of both the radius and ulna of the same side. There was a supra-condyloid fracture of the right humerus extending into the elbow joint, forming a T. A fracture of the upper third of the radius and of the ulna, and a fracture of the lower end of the radius. In spite of this great number of fractures, and of the serious lacerated wounds, she was able to walk into the hospital, and seemed to suffer comparatively little pain. Her temperature was normal, her pulse good, and there was



no evidence of shock, such as would have been expected from the nature of her injuries.

There was much difficulty experienced in adjusting and holding in place the different fractures, but with care and patience and plenty of plaster-of-Paris this was accomplished. Her recovery has been most satisfactory, and she has for all practical purposes full use of both arms.

Such an extensive number of fractures led him to suppose there must have been some serious lesion of the bones, but the most careful inquiries failed to give him any clue to such a state of affairs. She was a large, strong, and, apparently, perfectly healthy woman. She had never before had a fracture of a single bone, neither was there any history of fracture in any member of her family. She was born in Ireland, and had lived there until a few years ago, and had always been in good health and a hard worker.

Dr. H. R. WHARTON asked the experience of members in regard to multiple fractures, whether they had found much constitutional disturbance, or many cases of sudden death following multiple fracture. His own experience had been that generally patients do well. Last summer he had had under treatment a boy, six years old, who had fallen, and sustained a compound fracture of the nose, fracture of both bones of each forearm, and fracture of both thighs about the middle of the shaft. The patient did perfectly well with normal temperature for a week. He was doing well when he saw him at 12 o'clock noon. In the evening of the same day the resident noticed that his breathing was peculiar, and an hour afterward the patient was moribund. He died of cerebral complication. Possibly, it was a case of fat embolism, which is said to follow fractures. He had seen another patient die very much in the same way with a simple fracture of the femur. No post-mortem was made in either case.

Dr. THOMAS G. MORTON, some years before, had seen in consultation a lady, eighty-four years of age, who had gradually during ten years lost her vision from cataracts. Soon after this she sustained in a fall a fracture of both bones of the forearm, the humerus about the middle, and the shaft of the femur near the great trochanter. Complete recovery from these injuries following showed such an excellent repair that six months afterward he had operated upon both eyes at the same sitting. Perfect vision followed in each, which continued until her death when in her ninety-seventh year.

## METATARSALGIA (MORTON'S PAINFUL AFFECTION OF THE FOOT).

Dr. THOMAS S. K. MORTON read a paper with the above title, see page 680.

Dr. W. W. KEEN remarked that he had only seen one case of this affection, the patient having been a lady, on both of whose feet he had operated five years ago. Since then she has been able to walk perfectly well, and to dance.

Four years ago he himself had an attack, which he thought might be the same. He had every symptom that Dr. Morton has described. The attack came on about the time of his summer holiday, and he was unable to walk without limping from the excessive pain. When the pain came on he was compelled to go to his room, or sit down wherever he happened to be, and remove the shoe. He had a pair of shoes made with a thicker and wider sole, and a little larger, but without relief. Dr. J. C. Wilson suggested a gouty origin, and put him on appropriate treatment, and the pain disappeared, and he had been perfectly well ever since.

Dr. THOMAS G. MORTON said that as early as 1870 his attention was first directed to this painful affection of the foot, and he then felt satisfied that he had a malady which had not previously been described. In the *American Journal of the Medical Sciences*, for January, 1876, he published an account of this painful local affection, and subsequently reported a number of cases which he had successfully operated upon. Later, in various journals, the subject received attention, until at present the disease is generally understood. In 1891, Dr. E. H. Bradford published an interesting account of a number of cases which had come under his care, and more recently numerous authors have given their experience.

A medical man from Hagerstown, Md., once called upon him and stated that he was seeking for relief from a neuralgia of the foot, which was so terrible that he was willing even to submit to amputation of the limb. The only relief he obtained was by injections of morphia. The operation was completely successful, and the doctor went to his home on the third day afterward, and has never had any pain since.

Dr. Morton had generally found the disease in one foot; but occasionally in both, and had often operated on both feet at the same sitting. Now and then he had amputated the toe instead of resecting the

joint. The pain in many cases is slight, and only requires a proper shoe and a flannel bandage to keep the toes from rolling; in others nothing except an operation will suffice.

The question has been raised as to whether the painful nerve might not be excised instead of excising the joint of the toe. He apprehended there would be great difficulty in finding the nerve, and unless all the soft parts surrounding the joint were removed, some branches would remain; while if the pain is due, as he thinks it is, to the peculiar relation of the fourth joint as compared with the third and the fifth, no treatment except joint removal will answer.

## EDITORIAL ARTICLES.

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### LISTER'S PRESENT ANTISEPTIC PRACTICE.<sup>1</sup>

IN a recent lecture at King's College Hospital, in London, Prof. Lister related in detail the means he now adopts and the principles upon which he proceeds in order to attain constancy of aseptic results in his practice. He considers the subject in two divisions: (1) the avoidance of the introduction into the wound of material capable of inducing septic changes in it; and (2) dressing the wound in such a manner as to prevent the subsequent entrance of septic mischief.

When the lecturer first entered upon this subject—knowing as he did that wounds with rare exceptions underwent putrid suppuration—he naturally considered them very favorable soil for the development of septic organisms. The experiments of Pasteur made it evident that the air of every inhabited place teemed with microbic life. Not understanding how to discriminate among them, it was supposed that any one of them would produce serious mischief in a wound. This is now known to be incorrect. In the first place, it is known that normal blood serum is by no means a favorable soil for the growth of bacteria, provided that they are in an attenuated condition. Secondly, and of even greater importance, is the fact that the living animal body has the power of defending itself against microbes introduced into it, chiefly by the process of phagocytosis. By the light of these facts it is recognized that microbes in the form in which they are present in the air are not likely to develop in wounds, whence the once dreaded atmospheric dust may be disregarded in our operations. This renders unnecessary either irrigation or spraying, which is a form of irrigation.

<sup>1</sup> An address on the Antiseptic Management of Wounds, by Sir Joseph Lister, Bart., F.R.C.S. (London). London *Lancet*, January 28 and February 11 and 18, 1893.

The points requiring attention are the exclusion from wounds, during operation, of the grosser forms of septic mischief, such as exist in impure sponges, in dirty instruments, or in any unclean material upon the surgeon's hands, or the patient's skin. The *entourage* of the operation is managed by covering the region around it with towels soaked in a trustworthy antiseptic solution to avoid contamination of the wound from hands which have been in contact with septic objects.

For the purification of sponges there is nothing better, after all, than the agent first used—carbolic acid, which is greatly superior to corrosive sublimate. It is a happy circumstance that the organisms having the most resisting spores do not enter into surgical consideration. The surgical microbes are almost exclusively sporeless micrococci, although some are much more resisting than others, as, for instance, the staphylococcus pyogenes aureus; and in such solutions as would be employed in surgery, carbolic acid destroys this organism much more rapidly than does the bichloride of mercury.

The tubercle bacillus—a spore-bearing microbe—was shown by the experiments of M. Yersin, at the Institut Pasteur, to be killed in thirty seconds by a 5 per cent. watery solution of carbolic acid and in a minute by a 1 per cent. solution, while a  $\frac{1}{10}$  per cent. corrosive sublimate solution required ten minutes to accomplish the result.

To further demonstrate the power of carbolic acid over tubercle bacilli, Prof. Crookshank made the following experiments: To phthysical sputum was added in a test tube about five times its volume of 5 per cent. carbolic solution. This was freely shaken, and after a certain time the supernatant liquid was poured off from the precipitate. Sterilized water was then poured in abundantly and shaken up with the precipitate to wash out the carbolic acid; and of the precipitate which again formed a little was introduced by means of a sterilized pipette under the skin of a guinea pig's thigh. If the bacilli were destroyed no harm would result to the animal; if, on the other hand, they remained alive, the fact would declare itself in due time by enlargement of the inguinal glands affected by the tubercle.

One portion of the sputum was subjected to the action of the carbolic lotion for a minute, another portion for an hour, and a third portion for four hours. Three guinea pigs were inoculated with sputum which had not been acted on by carbolic acid at all, but treated in a similar manner with sterilized water. Upon examination, five weeks later, the three which had been inoculated with the sputum on which carbolic acid had not acted, had all great enlargement of the inguinal glands of that side, showing that tubercle had developed there. The one that had received sputum acted upon by the solution for one minute had some enlargement, but very trifling compared with the other three. The other two, on which the carbolic acid had acted longer, appeared to have absolutely sound groins, showing that the tubercle bacilli, in the most resisting form in which they are found, had been perfectly destroyed by the action of 5 per cent. carbolic solution for one and four hours, while even one minute had weakened them very materially.

The lecturer found this a very satisfactory matter, since it gave experimental demonstration of a fact of which he had long been convinced by experience, that tubercle bacilli would not be found in sponges if they are kept a considerable time in 5 per cent. carbolic solution. He treats his sponges in the hospital by washing them with soap and water and afterward with soda; then thoroughly washing again with water and, finally, after drying, put to steep in a 5 per cent. solution till they are required for use. In private practice he puts his sponges after an operation into a tank of water and lets them putrefy there; the fibrin, which clings among the pores of the sponges, becomes liquefied by putrefaction. They can then be washed thoroughly clean of their fibrin, the washing being continued until they no longer give a red color to water. They are then put away in a 5 per cent. carbolic solution. In Edinburgh he used to proceed in a bolder way. Taking the sponges out of a putrid tank he washed them in water, and sometimes, if he was in a hurry, even before the water which came from them was freed from the red color, he dipped them into 5 per cent. carbolic solution and took them at

once to his operations. He has even applied a sponge so treated immediately to a wound for the purpose of exercising elastic pressure and absorbing blood and serum from it, and then put on the external antiseptic dressing over it without any bad result. These facts he considers sufficient to enforce a conviction that it is not necessary to discard these most valuable articles and substitute for them sterilized tissue of any kind, all of which is incomparably inferior to the sponge for the purpose of absorbing blood.

He emphasized the inconvenience of sterilizing instruments by boiling, and the ease with which sterilization by immersion in a 5 per cent. carbolic solution may be accomplished. With regard to the length of time instruments require to be left in the solution, much depends on the care with which they have been washed before being put away. Toothed instruments, such as forceps, require especial attention; they should always be brushed with a nail brush before they are dried, so that there may be no crusts of dried blood upon them, which the carbolic lotion might require a considerable time to penetrate. If this has been done they can be sterilized in a very short time. In the lecturer's private practice instruments are put into 5 per cent. carbolic solution just before the patient is brought into the room; the time during which he is anæsthetized and other preparations are made is quite adequate for sterilization.

In purifying the skin of the patient, contact with the antiseptic lotion for hours, as is sometimes done, is unnecessary, a few minutes' action of the 5 per cent. carbolic lotion being really sufficient. The carbolic lotion would cause serious irritation if used for purifying the eyelids before ophthalmic operations, and in this special case a weak solution of corrosive sublimate applied in compresses is probably the best, but it must be continued for a lengthened period.

Carbolic acid is not only a more efficient surgical germicide than corrosive sublimate, but it is much more efficient in cleansing the skin. It has a powerful affinity for the epidermis, penetrating deeply into its substances, and it mingles with fatty materials in any proportion. Corrosive sublimate, on the other hand, cannot pene-

trate in the slightest degree into anything greasy ; whence those who use it require elaborate precautions in the way of cleansing the skin. All of this is unnecessary with carbolic lotion. Sir Joseph does not even use soap and water, trusting entirely to the carbolic acid.

The sponges, during operation, are washed in  $2\frac{1}{2}$  per cent. carbolic lotion, and before closing the wound is washed with the same solution.

In case it should be necessary to operate in the absence of a chemical antiseptic, the lecturer advises: (1) to have the sponges and also fine silk threads for securing the bleeding points boiled, treating such instruments as will not be injured by the process in the same way; (2) use boiled water for washing the sponges during operation, although unboiled water, if free from visible floating particles, is not very likely to cause mischief; (3) towels dipped in boiled water and spread about the seat of operation will diminish the chance of contamination of the wound from surrounding objects; (4) thorough cleanliness in the ordinary sense by the free use of soap and water must be practiced for the hands of the surgeon and his assistants, and for the skin of the part operated upon; (5) for sutures, under these imperfect antiseptic conditions, materials incapable of absorbing putrescible liquids—silver wire, silkworm gut or horse hair—should be used rather than sterilized silk, in order to avoid supuration in the stitch tracks; (6) for dressing the wound in the absence of chemical antiseptics, dry substances, such as absorbent cotton, wool or old linen (preferably boiled before use), are far better than anything kept permanently moist like water dressing. As bacteria develop the less easily in proportion to the attenuation of an organic solution, so the blood and serum oozing into a dry dressing, becoming more or less inspissated by evaporation, are in proportion a less favorable soil for microbic development. It is a wonder that wounds ever healed by first intention under the old water dressing; clean at the moment of application, it was invariably stinking when it was taken off in the course of twenty-four hours; it seems marvelous that sepsis ever failed to develop in a wound with this putrid mass



lying over its outlet. But with the dry dressing following the other precautions enumerated, union by first intention is a very frequent occurrence.

Sir Joseph then proceeded to a discussion of iodoform as an antiseptic, remarking that while it seems to have little effect upon the development of bacteria, it certainly exercises an important antiseptic influence in wounds, which probably is due to its chemical action upon the products of the bacteria, rendering mere toxins harmless. In circumstances where the exclusion of septic agencies is impossible, as in operations upon the anus or in the presence of putrid sinuses, iodoform is of very high value. On the field of battle it is unsurpassed. In compound fractures, while the wound should be purified with carbolic lotion, iodoform should be used in the dressing. In an operation where the integument has not been broken, however, iodoform is entirely superfluous, if there be available some trustworthy material for preventing the subsequent access of septic mischief. Iodoform will not do this. A porous material impregnated with it, when soaked through with blood or serum, will allow the microbes of external defilement to propagate in its substance. It is essentially in the interior of the wound that the virtues of iodoform are displayed.

Any material that is merely aseptic, such as cotton-wool or gauze sterilized by heat, having nothing in its substance to check in any degree the development of microbes, will allow the septic evil to spread freely to the wound from the external world, if blood or serum happens to penetrate at any point to the exterior. The necessary sterilizing apparatus, moreover, is too expensive for the private practitioner, and further, the merely aseptic material, having no power to correct any accidental defilement, must require an almost impossible degree of care in its manipulation. Sir Joseph has seen the system in operation in very able hands with results by no means satisfactory.

An external antiseptic dressing, the lecturer remarks, should have four essential qualities to be ideally perfect: (1) It should contain some thoroughly trustworthy antiseptic ingredient. (2) It should have that substance so stored up that it cannot be dissipated to a

dangerous degree before the dressing is changed. (3) It should be entirely unirritating. (4) It should be capable of freely absorbing any blood and serum that may ooze from the wound.

The carbolic gauze formerly used contained a sufficiently efficient antiseptic, but, as it was volatile, it was perpetually flying off in spite of all attempts to fix it, and it was uncertain in how many days it might have so far disappeared from the dressing as to leave it untrustworthy. Carbolic acid also had the disadvantage, as an element of an external dressing that, acting with peculiar energy on the epidermis, it interfered seriously with cicatrization, and the interposition of a "protective" was necessary to shield the wound from its action. Moreover, the resin contained in the gauze for the purpose of fixing the carbolic acid detracted from its efficiency as an absorbent of blood and serum.

Corrosive sublimate had the advantage of not being volatile, but it was readily washed out of the gauze or wool charged with it, and under some circumstances it proved very irritating; the discharge, passing from one part of the dressing to another, took up more and more of the bichloride in its passage, and sometimes became so strong a solution of the salt as to cause vesication. An endeavor was made to remedy these defects by combining the bichloride with the albumen of the serum of horse's blood; but though the sero-sublimate gauze answered its purpose, in so far that it contained the bichloride better stored up and in a less irritating form, it had inconveniences, especially as regarded its preparation, which induced its abandonment.

The agent which Sir Joseph has found the most satisfactory as the antiseptic ingredient of the dressing is the double cyanide of mercury and zinc. Cyanide of mercury, while it has powerful antiseptic properties, is very soluble and highly irritating; but the combination of cyanide of zinc with it has the same sort of effect, but in a much higher degree, as the albumen of the sero-sublimate gauze had upon the bichloride. The cyanide of zinc keeps the cyanide of mercury from being dissolved away, and also from becoming an irritant;

it is chained down by the cyanide of zinc, with which it is combined. The double salt is very little soluble in blood serum, requiring between two and three thousand parts to dissolve it, so a small quantity will long outlast a free flow of discharge through it. It thus fulfills the condition of persistent storage. It is at the same time practically unirritating; wounds heal under its immediate contact without the necessity for an interposed protective. With regard to its antiseptic power, even the small quantity dissolved by serum proves ample to prevent bacteric development. In one experiment serum of horse's blood containing  $\frac{1}{30000}$  part of the salt remained clear and odorless for more than a fortnight at the temperature of the body, in spite of inoculation with putrid material, and even  $\frac{1}{100000}$  part prevented all growth for ten days. When mixed with serum and corpuscles, it prevents putrefaction in smaller quantity than any other antiseptic known. The severity of the test of an antiseptic is in proportion to the amount of albuminoid substances in the solution tested; and when the red corpuscles are mingled with the serum, as is the case in the first twenty-four hours after the infection of a wound, a much larger amount of the antiseptic is needed than with the serum only. Four times more corrosive sublimate is required to prevent putrefaction in serum and corpuscles than in serum only. The double cyanide answers the purpose in half the quantity that is necessary with corrosive sublimate. The lecturer packed a piece of glass tube charged with 3 per cent. of the soluble salt, and poured into it serum and corpuscles obtained by whipping pig's blood. He then inoculated one end of the saturated gauze with a drop of septic serum and kept it at the temperature of the body, with provision for preventing evaporation. After the lapse of five days the entire mass of gauze was found pure in odor and free from bacteric development, as tested by microscopic examination of stained cover-glass preparations of the contained blood. Meanwhile, a piece of unprepared gauze similarly treated showed bacteric development within twenty-four hours.

Referring to the essential difference between germicidal and inhibitory power in an antiseptic, Sir Joseph remarked that the cya-

nide of mercury is far superior to the bichloride in inhibitory power, but very inferior to it as a germicide, and the double cyanide of mercury and zinc, while admirable as an inhibitor, is very feeble as a germicide, so that materials charged with it can by no means be positively free from living organisms. Hence, if gauze charged with the double cyanide of mercury and zinc were applied dry to a wound, the time might come when, if the discharge were free, the salt, in spite of its slight solubility, might be all washed out of the deepest parts of the dressing ; and as soon as this would occur, living microbes contained in it would be free to develop toward the wound. To guard against this risk, the gauze is treated before using it with a reliable germicide. The one now used by Sir Joseph is the 5 per cent. carbolic solution, which, besides being thoroughly effective, has the further advantage that it soon flows off from the dressing and leaves nothing in contact with the wound but the unirritating double cyanide and the cotton fabric.

He formerly used a  $\frac{1}{40}$  per cent. bichloride solution for this purpose, but he soon abandoned it upon discovering that the bichloride formed, with the double cyanides, a curious soluble triple compound with extremely slight germicidal power. It also proved to be extremely irritating, even inducing extensive excoriation when applied wet.

It is entirely unnecessary to have the gauze wet with the 5 per cent. carbolic solution ; mere dampness is sufficient. It may be conveniently moistened as follows : The gauze is ordinarily sold in pieces of three or six yards, folded lengthwise in eight layers ; these are unrolled and half the number to be moistened are roughly sprinkled with the lotion ; the wet and dry pieces are then superposed alternately and the whole rolled firmly together, and in a few minutes the entire mass is uniformly damp. If the gauze thus prepared is securely wrapped in mackintosh to prevent evaporation, it may be absolutely trusted for excluding mischievous microbes.

When the pure cyanide of mercury and zinc is diffused in water, and a piece of gauze is charged by drawing it through the liquid and

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drying it, it is found that the powder dusts out of the gauze on the slightest touch, irritating the nostrils extremely. This he remedied at first by starch, and then he conceived the idea that some coloring matter might behave in the same way, so as to contribute the additional advantage of making it possible to judge by the tint of the gauze whether or not the salt were uniformly distributed through it. After trying various dyes for a considerable period, the lecturer has settled upon an aniline dye, the hydrochlorate of mauveine, known in commerce by the name of purified rosolane. This dyes the white double cyanide a mauve color.

In charging the gauze, the dyed cyanide is diffused with the pestle and mortar in a 5 per cent. solution of carbolic acid, in the proportion of about thirty grains to the pint; the gauze, which must be of thoroughly absorbent quality, is drawn in a thickness of about eight layers through the liquid, which is conveniently placed in a trough having a bar near its lower part, beneath which the gauze is made to pass, care being taken to have the liquid continuously stirred to prevent precipitation of the salt. The carbolic lotion is used in preference to water, both because the powder is very much more easily diluted in it and because it is desirable that any dirty material which the gauze may happen to contain may be sterilized. The gauze so prepared may be taken down and wrapped in mackintosh when only partly dry, avoiding the later trouble of moistening it.

When a free discharge is anticipated, a piece of thin mackintosh, sponged with carbolic lotion, may be applied over the exterior of the dressing to prevent the blood and serum from passing directly through it. The interference with the inspissation of the discharges by evaporation is a matter of indifference if the dressings are efficiently antiseptic.

The dried cyanide powder may be mixed up with the carbolic lotion into a sort of mud or cream, which may be applied with a camel's hair brush to parts where there is very little space between the wound and some source of septic contamination. The lecturer by this means has repeatedly been able to avoid suppuration in the

vicinity of the anus. The mass of antiseptic salt upon the skin prevents the microbes from working their way into the wound under the narrow strips of dressing alone available. There are also situations, such as the pubes, where the cyanide cream applied to the hairs converts them with great advantage into a part of the antiseptic dressing.

In changing the dressings, he makes it an invariable rule to cover the wound with something reliably antiseptic before washing surrounding impure parts, so as to avoid the chance of defiling the wound with them. While it is doubtless true that the dressing that is applied immediately after operation might in most cases be left untouched for several days, nevertheless, when the discharge is free, Sir Joseph prefers to remove the first dressing when the first twenty-four hours have passed. Thus the serum and corpuscles are gotten away, which, constituting the largest amount of discharge in the case, also test the antiseptic dressings the most severely.

While any opinion which Sir Joseph Lister might express with regard to antiseptic surgery would be heard with profound attention by the surgical world, the address, of which we have quoted the larger portion, giving the details of his methods at the present advanced stage of his work, is a most exceptionally interesting contribution to surgical literature.

JAMES E. PILCHER.

#### OPERATIONS UPON THE STOMACH AND INTESTINES PERFORMED IN THE SURGICAL CLINIC AT HEIDELBERG.<sup>1</sup>

CZERNY and Rindfleisch have given a detailed account of the operative work which has been done upon the stomach and intestines at the Heidelberg Clinic, enriched with the lessons it has taught. More than eleven years ago, Billroth opened a new field to abdominal surgery by his resection of the pylorus. The experiments of Gussen-

<sup>1</sup> Beiträge zur klinischen Chirurgie, Bd. ix, Heft 3.

bauer and von Winiwarter, Czerny and Kaiser, incited Billroth to his bold step. The cholecystenterostomy by von Winiwarter; the perfecting of the intestinal suture by Gussenbauer, Czerny and Wölfler; the gastroenterostomy by Wölfler and Hacker; the pyloroplasty by Heineke-Mikulicz; the extending of Billroth's ileocolostomy to enteroanastomosis; the clinical reports of Wölfler, Eiselsberg, Billroth and others, are the landmarks which indicate the progress in this field.

When these operations, although they have been undertaken and perfected by numerous surgeons, have not received general recognition, it has been for the reason that, as with all new operations, in the beginning too much is expected of them; and because the discoverer has had to experiment too much in order to find the right method. The operations have also been performed on cases which were too far advanced in their disease.

*Resection of the stomach* for carcinoma was performed twelve times in the Heidelberg Clinic from 1881 to 1892. Seven operations, with three deaths, were performed on male patients; and five, with two deaths, on females. The ages varied from twenty-eight to sixty-one. The average age was forty-nine years. Colloid carcinoma was observed four times; and scirrhus and glandular carcinoma three times.

One case died of collapse because of her very feeble condition at the time of operation. Two other cases died on the fourth and seventh days respectively from gangrene of the colon, because the adherent mesocolon had also to be resected. Another perished from septic peritonitis after the operation for recurrence, having gone through the primary pylorus resection, and enjoyed good health for ten months thereafter. The fifth case died from secondary perforation at the suture line.

All five of these operations had better not have been done, or at least have given place to the more quickly performed gastroenterostomy.

Seven patients recovered after the pylorectomy, and had the

feeling of relief from a serious trouble, and a pronounced improvement of digestion and of their general condition. This improvement in the majority of cases lasted only a few months. The increase of weight in these patients was 15, 21, 24 to 28 pounds.

Two cases are still living, fifteen and sixteen months after the operation, working and enjoying good health, with no sign of recurrence.

Five died, 18, 2, 15, 7 and 10 months after operation, with the symptoms of recurrence. This is a rather short respite when we consider that it is purchased by a dangerous operation, and that, in the average, the first half is really the period of recovery from the operation; while in the last half the patient is suffering from the symptoms of recurrence. Nevertheless, these results must not be disparaged. They are obtained in a disease which is leading to an inevitable death, and with patients who have given up all hope of having their condition improved. For more than 20 per cent. permanent cures in carcinoma of the stomach can the most sanguine operator scarcely hope.

Five cases were operated upon for benign stenosis of the pylorus. One of these, from whom the stenosed pylorus was removed by the elliptical incision, is at present, ten years after the operation, strong and healthy; and the stomach dilatation has disappeared. Another case of stenosis of the œsophagus and pylorus from potash poisoning is of especial interest. The pylorus was dilated after the method of Loretta, and this, as well as the pyloroplasty after Heineke-Mikulicz, failed; so that finally a resection of the annular cicatrix had to be done. These complicated operations resulted in a permanent cure, and at the present time, four years after the accident, the patient is strong and well. In the three remaining cases of simple hypertrophy of the pylorus, resection was performed under the supposition that the lesion was carcinomatous. On account of the reduced condition of one of these patients, it would have been much better to have done a gastroenterostomy or pyloroplasty, had the correct diagnosis been made. In two cases death occurred after the operation—one from



suture necrosis, and the second from pneumonia and cardiac insufficiency. A third case was not a permanent cure, for cicatricial contraction resulted in an angulation in the duodenum; and the patient, who had at first been much improved, began to sink, and nine months after the operation died.

These tumors, resembling hypertrophy of the pylorus, seem to be the result of small ulcerations located on the lesser curvature near the pyloric opening, and, like fissures in the rectum or bladder, give rise to an hypertrophy of the sphincter muscle. In the cases of Mikulicz<sup>1</sup> and Lauenstein<sup>2</sup> the ulcers were situated at the junction of the lesser curvature with the pylorus, and the subsequent hypertrophy suggested the false diagnosis of carcinoma. In both cases, as well as in two of the three cases of Czerny and Rindfleisch, free hydrochloric acid was not present, although in simple ulcer the amount of free acid is usually increased. There should be some means of more accurate differential diagnosis between this simple hypertrophy and carcinoma of the pylorus, between which confusion has evidently arisen. Lauenstein, for example, has observed five benign stenoses among twenty pyloric tumors. If these cases could be correctly diagnosed, more would be subjected to pyloroplasty or gastroenterostomy than to resection.

Two elliptical excisions for sarcoma both recovered; of these one died from recurrence thirteen months after the operation; the other is perfectly well, at present, two years after operation.

Of the nineteen resections on the stomach there were three elliptical excisions, all of which survived. Of the sixteen pylorectomies, seven perished as a direct result of the operation.

*Gastroenterostomy for Pyloric Stenosis.*—After no operation is it so difficult to say which cases shall be regarded as recovered as after the gastroenterostomy, which is almost always performed for incurable carcinoma, and which, even in favorable cases, usually results in death in a few months. In Senn's earliest work he published thirteen cases

<sup>1</sup> Ortmann: Pylorus Stenoses Deutsche med. Wochenschr., No. 9, 1889.

<sup>2</sup> Centralbl. für klin. Medizin, Beiträge, s. 33.

of gastroenterostomy, with eight recoveries, although four of them died within the first eighteen days.<sup>1</sup> His mortality must be figured at 69.23 per cent., Czerny and Rindfleisch say, and only those cases can be called recoveries which have healed, and which have taken nourishment for some days.

Of their twenty cases, twelve recovered and eight died. Mortality, 40 per cent. Seven of these operations were done in the years 1885-8, with four deaths; and thirteen in 1889-91, with four deaths. If a conclusion may be drawn from such small figures, it would seem that in the Heidelberg clinic the indications for the operation have somewhat increased, and the final results have improved. In the years 1890 and 1891, six cases in succession recovered. Seven females and thirteen males were operated upon. The ages varied from twenty-eight to fifty-seven years, averaging 41.5.

The signs of pyloric stenosis had been observed in these cases from three months to fourteen years. In five cases the duration of the trouble had been two years; in two cases, four years; and in one, three years. One case referred the commencement of symptoms twenty years back. In this case, as in two others, the patient for a long time suffered from gastriculosis, with cicatricial thickening of the pylorus. The other seventeen cases were carcinomatous. The long duration of the disease can only be explained by assuming that the carcinoma symptoms were continuous with those of an old ulcer or gastritis.

The symptoms of pyloric stenosis were gastric pain; feeling of fullness; discomfort, especially after eating; vomiting; constipation. In rare cases, of bleeding, ichorous ulcers, diarrhoea was observed with diminution in the amount of urine and pronounced emaciation, which were temporarily improved by restricted diet, lavage and nutrient enemata. Lastly appeared the symptoms arising from long retention of food in the stomach. The greatest attention was given to the chemical and physical examinations. The stomach was out-

<sup>1</sup>The Surgical Treatment of Pyloric Stenosis, *Medical Record*, November 7 and 14, 1891.

lined as accurately as possible by palpation and percussion. The contents of the stomach were subjected to chemical examinations. Valden's test for free hydrochloric acid gave the most satisfactory results. Among fifteen cases which were examined, three showed an abundance of hydrochloric acid; and each of these was a simple case of ulcer with narrowing of the pylorus. Of twelve carcinoma cases, only one gave a trace of free acid. In general, the testing for hydrochloric acid proved a very valuable help in the diagnosis.

The size of the stomach and the movability of the tumor were estimated by distension with gas or fluid, and by palpation and percussion. Notwithstanding a marked degree of pyloric stenosis, dilatation of the stomach may not be present. A characteristic example is cited—a case of small-cell alveolar, carcinomatous infiltration, which extended throughout the submucosa and subserosa, like the carcinoma lenticulare mammae, and prevented dilatation of the stomach. A compensatory hypertrophy of the muscularis was also observed in many cases. On the other hand, among the cases of exploratory incision for dilatation of the stomach were those in which the symptoms of stenosis had been by no means prominent, the appetite, digestion and bowel action having remained good. In these cases Czerny does not regard gastroenterostomy indicated, and if, on opening the belly, it is found that the carcinoma cannot be extirpated, it is best to close it up again. Inasmuch as the pylorotomy has given almost as good results—43 per cent.—as the gastroenterostomy, and as it gives a better chance for prolonging the life, when practicable it should be given the preference. And this depends on whether the pylorus tumor can be removed without too great difficulty and the separation of adhesions, especially with the pancreas, and whether it is still localized, and has given rise to no metastases.

A mortality of 40 per cent. is much too great for such an operation as gastroenterostomy for carcinoma, which at the best is only palliative. Czerny believes that this mortality will be greatly reduced, as the brilliant results of Lücke have shown; and as have also his last six cases, which all recovered.

The cause of death is next considered. Two cases died of septic peritonitis on the second and fifth days, and four of collapse on the first, second, fourth and fifth days. Three of these last were beginning to develop pneumonia. Twice was pneumonia the cause of death. It is interesting that only the first two cases died of septic peritonitis. The danger of this accident was diminished in the subsequent cases by a more thorough lavage with salicylic or boracic water, and by a better cleansing of the field of operation, and protection of the parts with aseptic or iodoform gauze compresses. Sponges, which were at first used, have been replaced by gauze. It so easily happens that a sponge which has been used to wipe up intestinal contents, after insufficient cleansing, comes in contact with the peritonæum, that sea-sponges have not been employed in the laparotomies at the Heidelberg Clinic since October, 1891.

One-half of the mortality was from collapse. These cases and the pneumonias belong to the class which came to the operation with a too greatly depleted resisting power. Patients too weak to retain nutrient enemata had to be fed by the mouth. The stomach operations did the best in the cases in which gastric alimentation could be entirely replaced by nutrient enemata for eight days. It is, therefore, very important that the operation be not deferred till the strength of the patient has sunk to a *vita minima*. When the patient is so weak that he can scarcely stand, when he can no longer retain enemata, when cedema and hypostasis is present, and the pulse is scarcely perceptible, the authors do not believe it proper to operate, but hold that the patient must be in condition to hold out for eight days with only nutrient enemata. The excellent statistics of Lücke are accounted for by the fact that his patients were not yet *in extremis*.

In only one of these mortalities can the operative technique be held accountable. In this case the contents of the stomach passed through the fistula, thence back into the proximal side of the jejunum, and through the duodenum and pylorus again into the stomach. This *circulus vitiosus*, which was the cause of fatal emesis, was

because of the failure to give the intestinal loop, which was made fast to the stomach, a half twist on its mesentery, so that the peristaltic wave from the stomach should be continuous with that in the intestine, as Lücke and Rockwitz have shown. The method which Czerny has followed consists in finding the duodeno-jejunal fold, and drawing it up from left to right against the stomach. This accomplishes the desired result spoken of by Jaboulay<sup>1</sup> and Braun.<sup>2</sup> In the second case operated upon, he proceeded in the following manner:<sup>3</sup> After opening the abdomen, the transverse colon and the stomach are lifted up, while an assistant presses the small intestines downward. The loop of small intestine lying in the angle just beneath the mesocolon and to the left of the spinal bodies is now seized. This is nearly always the beginning portion of the jejunum, which is so easy to find at its fixed proximal end. The operation can now be continued after the method of von Hacker. An assistant presses with both thumbs the posterior wall of the stomach against the mesocolon, while the tips of his fingers hold back the transverse colon. The mesocolon is now cut through and the opening enlarged up to 5 cm. diameter. The jejunum is then brought over from the left to the right, and fixed by its convexity by a running suture to the posterior surface of the stomach, with its long axis parallel to the long axis of the stomach. Both are incised parallel to this suture line to the extent of 4 cm., and immediately reunited by interrupted sutures passed through all the coats external to the mucous membrane. An interrupted mucous membrane suture is first applied about midway in the fore part of the wound, by means of which the anterior lip is somewhat retracted from the posterior lip. Interrupted sutures are then applied to the right and left of this until the opening is united by its first row of anterior sutures. These mucous membrane sutures are introduced as accurately as possible in the

<sup>1</sup> Archives Prov. de Chirurg., No. 1.

<sup>2</sup> Chirurgenkongress, 1892.

<sup>3</sup> Mittheilungen an der Heidelberger Naturforscherversammlung, Deutsche medic. Wochenschrift, No. 45, 1889.

border of the mucous membrane, about 2 mm. from the serosa. About sixteen to twenty sutures are used for the entire circumference of a 4 cm. wound.

After the anterior interrupted sutures have been closely cut, an anterior line of serosa sutures, either interrupted or running, is applied. Some accessory sutures, especially in the angles, strengthen the joints, and at the same time fix the borders of the opening in the mesocolon. The whole operation is easily performed in an hour.

When the intestines are returned, they lie in their natural position, except that the sutured jejunal portion is thrown over from left to right, and, therefore, the peristalsis of the stomach is continuous with the peristaltic wave in the jejunum. The securing of this natural position of the intestines is the ground which induces Czerny to prefer this operation to fixing the small intestine to the anterior wall of the stomach, according to Hacker's modification of Wölfler's method. When the stomach is enlarged, and there are no adhesions at the fundus, Hacker's operation is quite as easily performed as that of Wölfler.

In all the cases the double row of silk sutures stood the test. No leak could be demonstrated by a high degree of hydrostatic pressure, nor did any marked degree of edge necrosis occur.

Of the twelve recoveries, two died in the clinic. One, on the twenty-fifth day, was progressing well, when sudden vomiting occurred, resulting in the rupture of an adhesion, from which fatal hæmorrhage took place. Metastatic nodules were found in the peritonæum, and both ovaries, tuberculosis of both apices, and pneumonia in the left lower lobe. Another case gained fourteen pounds in weight, and then developed metastasis in the spinal column, decubitus, and died in ten weeks after the operation. Two other cases died on the sixth week, soon after their discharge from the clinic. Of these, one had no true convalescence, but steadily sank; the other left in a very good condition, but, on arriving home, died from some indiscretion in diet.

The following cases are more encouraging. One lived eleven

months, and during the first few months made such a good convalescence that his New York physician expressed his doubt as to the correctness of the diagnosis. His weight increased from 44.5 to 70 kilos. After five months the old trouble recurred, and he gradually sank. Another case increased in weight after the operation from 67 to 99.5 pounds; and five months after the operation she had developed so much adipose tissue that the tumor of the pylorus could scarcely be felt. The last two of her eleven and a half months of life after the operation were marked by a rapid recurrence of the old symptoms. Another case enjoyed five good months, and died six weeks after the recurrence of the old symptoms. The autopsy in this case showed that the anastomotic opening had shrunk to 8 mm. in diameter. No information could be obtained from the three other cases. The average length of life after the operation of the nine carcinoma cases, whose histories were followed up to date, is five to six months.

The two cases of benign pyloric stenosis, which for years had been unable to work, and suffering from pain, vomiting, hæmorrhage, constipation, etc., were completely cured by the operation. They gained over forty pounds in weight, and the gastric ulcers have evidently spontaneously healed.

*Exploratory laparotomies* have been performed much less of late than was formerly the practice, because of the greater experience in diagnosing the extent of the disease. Seven such operations were done during the first half of the period covered by these reports, whereas only three were done during the latter half. The question as to whether exploratory section is without danger is answered by the fact that three of the patients died seven, eight and fifteen days respectively after the operation. They all had metastases in the omentum, bloody ascites and complications which would render any operation dangerous; even simple puncture for the ascites. The remaining seven left the clinic untreated, and died at an average time of six and one-half months after the operation. The average life of the cases after gastroenterostomy was five and one-half months.

no case living longer than eleven and one-half months. From these figures it would seem that exploratory incision has more to offer than gastroenterostomy. Lawson Tait and others have not only observed the benefit resulting from exploratory laparotomy for tuberculosis, but also for malignant disease as well. The gastroenterostomies temporarily relieved the symptoms of obstruction and dilatation of the stomach, and thereby made the patients more comfortable. The most brilliant results were obtained in benign stenoses.

One of the cases of exploratory section deserves an especial notice. In this a carcinomatous deposit in the left lobe of the liver broke through the abdominal wall, and was afterward treated with zinc chloride.

Of nineteen stomach resections on eighteen patients, seven died. Death was due once to collapse, twice to colon gangrene, thrice to peritonitis from suture necrosis, and once to pneumonia.

Of the twelve cases which recovered, five cases of carcinoma of the stomach died from recurrence in from two to eighteen months—average ten and two-tenths months—after the operation. Two cases of carcinoma are still living without recurrence fifteen and twenty-six months respectively after the resection. Of the two cases of sarcoma, one was subjected only to exploratory laparotomy, the other was treated by elliptical excision, bore children, and was perfectly well four years after the operation, but died of recurrence in the fifth year.

One of the cases of benign stenosis died at the end of nine months from recurrence of the stenosis. Two of the cases are now living in perfect health four and ten years respectively after the operations.

After the twenty gastroenterostomies, eight died, two from peritonitis, four from collapse, and two from pneumonia. The remaining cases survived the operation, with great improvement in their conditions, from one to eleven and one-half months. Two cases with benign stenosis are strong and well at the end of one and two years respectively.

*Resections of Intestines for Malignant Disease.*—Ten malignant



tumors, all of the large intestine, were operated upon. Four were of the cæcum, two of the sigmoid flexure, three of the transverse colon, and one of the descending colon. In three cases the carcinoma had involved another portion of the gut, so that a double intestinal suturing was necessary. This occurred twice in growths of the transverse colon, which involved the sigmoid flexure and small intestine; and once a growth in the cæcum involved the duodenum.

Of these tumors one was medullary, one papillary, and four were ordinary glandular carcinomata. Three of these last, because of their scirrhus character, offered a much better prognosis than the others. It frequently occurs that glandular carcinomata of the intestine begin, like the glandular carcinomata of the mamma, as a dense, slowly-growing nodule, and later by a more vigorous cell-proliferation take on the character of the medullary form.

In three cases colloid carcinoma was found. The tenth case was a lympho-sarcoma of the transverse colon appearing five years after the removal of an ovarian sarcoma. At the present time, six years after the intestinal resection, the patient is entirely well.

Not all of the cases did so well, however. In all, were five recoveries and five deaths. Death occurred once from collapse, after a very long and difficult operation; and four times from septic peritonitis. Infection was due to intestinal contents coming in contact with the peritonæum at the time of operation. Death occurred on the first to the third day. In every case the suture line was perfectly satisfactory. Of the three double resections, two died. Of the five recoveries from the operation, one died of recurrence six months afterward. Four are still living in perfect health, and free from all the old trouble respectively ten, eighteen and twenty-one months, and six years after the operation.

Although these cases cannot be regarded as entirely out of danger, they show the advantages of the operation. Cases which have grown weak, and in which the tumor is scarcely movable, as were five of the above, had better not be subjected to the radical operation; but, when possible, an enterostomy should be done. The

most favorable cases are those of small scirrhus, which causes an early stenosis, and, therefore, comes under the surgeon's notice at an early date. In three cases no tumor could be discovered before the operation. And in two of these the small growth was discovered after an urgent enterostomy had been done. The growths were frequently removed at a second operation. The other small tumor was in the sigmoid flexure, and was discovered by an exploratory laparotomy, and treated by intestinal resection.

Six of these intestinal cases were females and four were males. All of the men died after the operation, while five of the six women recovered. The ages varied from thirty-four to fifty-two years, averaging forty-five. The thirty-four-year-old patient was the case of sarcoma.

*Resection for Tuberculous Ulcer of the Intestine.*—Eleven cases are reported, five of which have already been published elsewhere.<sup>1</sup> König has also published a number of cases of tubercular stricture of the gut.<sup>2</sup>

Of Czerny's eleven cases, nine involved the cæcum, three of which had developed fistulæ opening externally. In another case an enterocæcal fistula was found; while in still another, a small nodular, peritoneal tuberculosis had caused perforation through the small intestine.

Two cases in which the fistula was divided, and the openings closed by linear suture after the edges had been freshened by elliptical incision, did not recover. In another case five fistulæ were closed by linear suture, and two were treated by the resection of 9 cm. of small intestine. Besides these lesions, the patient was suffering from general tuberculosis and amyloid degeneration.

After eight typical resections for stenosing ulcers of the ileo-cæcal region, one patient, aged fifty-four, died after the removal of a kidney, the ureter of which had been injured in freeing from it the

<sup>1</sup>Beiträge zur klin. Chirurgie, vi Band, Tübingen. 1890.

<sup>2</sup>Die strikturierende Tuberkulose des Darmes und ihre Behandlung. Deutsche Zeitschrift für Chirurgie, Band XXXIV.

intestinal adhesions. He recovered from the shock of the operation, and died on the seventh day from peritonitis, due to secondary necrosis of the suture line. The very radical operation was done in this case for the reason that it was supposed to be a carcinomatous growth. The other seven cases show that resection for tuberculosis in young persons, for it usually occurs in such, when properly performed, is relatively well borne.

One case died from a profuse intestinal hæmorrhage soon after returning home. This particular patient was also suffering from pulmonary tuberculosis and an ischio-rectal abscess. He was operated upon only because it was his earnest wish.

Four of the patients have been entirely free from their intestinal trouble for six and fourteen months, and two and five years respectively. It is pitiful to relate that three of these patients are so poor that they have to live almost exclusively on potatoes. The period after the operation in two other cases has been too short for any thorough observation, though in both there has been a general improvement and increase in weight. Czerny states that it may be well said that the results of resection for ileo-cæcal tuberculosis are eminently satisfactory.

The ages of the patients ranged from seventeen to fifty-four, and averaged thirty-four years. Four were females and seven males. In most of the cases the intestinal disease was preceded by some other trouble—influenza, pulmonitis or typhoid, and in young patients, lymphadenitis, or signs of tuberculosis in the periosteum, bones or joints. The patients sought medical aid, either for the symptoms of intestinal stenosis or tumor, or for suppurating or fecal fistula. The thighs being flexed and the bowels emptied, a cylindrical tumor could be detected by careful palpation in the ileo-cæcal region.

In the other class of cases the tuberculous process in the intestine goes on, with or without stenosis, to the development of paratyphlitic abscess, which may gradually find its way to the surface.

These ulcers seem to begin usually on the ileo-cæcal valve, and extend upward, involving the ascending colon, but not the ileum or

cæcum. The edges are irregular and dentate, and often undermined. Islands and bridges of mucous membrane often remain intact. The appendix and cæcum shrink and become lost in the cicatricial tumor mass. As the ulceration advances up the colon, the process of cicatrization follows it from below. This previously ulcerated area becomes covered with an irregular epithelium, often the seat of polypoid and papillary projections. The cicatrization causes a narrowing of the lumen, which may narrow the ileo-cæcal orifice to the size of a lead pencil, or a mucous membrane bridge may divide it into narrow openings. An enterolith, or a foreign body reaching this place, develops immediately the picture of ileus. The fact is also called attention to, that these patients, through experience, become so careful in regulating their diet, that it is surprising how long they go on with one of these very narrow strictures.

In rare cases do these ulcers cause perforation of the bowel. Such an accident is preceded by adhesions, which cause the perforation to result in an enteroanastomosis or peri-intestinal abscess.

*Cases of Intussusception.*—Two cases occurred in children, who were brought to the clinic on the second day after the appearance of symptoms of incarceration. One case was cured by massage under narcosis, and the other tumor was made to disappear by the use of high enemata. Another case was subjected while in extremis to an ileostomy, which was followed by spontaneous defecation, recovery and final closure of the intestinal opening by suture. This was in all probability an intussusception, which, after the emptying of the gut above it, underwent spontaneous reduction.

Of five cases in which invagination occurred, the ileum with the cæcum was contained in the colon in three cases; in one case the ileum alone was thus invaginated; and in one case the sigmoid flexure was invaginated into the rectum. In some cases this lesion gave rise to acute obstruction symptoms; in other cases the symptoms were those of chronic obstruction.

In one case of obstruction, which had existed for nine days, an extensive gangrenous condition of the gut made a resection of 72 cm.

necessary. Another case, in which the invaginated portion was thrown off after five and one-half months, was subjected to resection of 51 cm. of gut, which resulted in a perfect cure.

Two other cases are reported, in which invagination had existed for six months. One was operated upon for supposed tumor of the ileo-cecal valve, and resection was performed. In the other an exploratory incision was made into the cæcum. Both cases went on to permanent recovery.

Lastly, the *sutures of intestine for the closure of fecal fistulae, due to incarcerated herniæ*, are reported. Seven cases are presented, of which all excepting one were cured. This patient was greatly prostrated with decubitus and tuberculosis, and the operation was undertaken under most unfavorable circumstances. Death resulted from peritonitis, probably from perforation in the line of suture, the patient dying suddenly of collapse on the evening of the day following the operation.

Two umbilical herniæ are of interest. In one it was necessary to make an artificial anus in the transverse colon, after four days of strangulation. Two months later a strangulated femoral hernia on the left side was operated upon. After this the colon began to contract just before it reached the umbilical fistula, until finally it became so narrow that obstruction resulted. A laparotomy was performed, the transverse colon freed from its adhesions, the constricted portion resected, and the gut united by the circular suture. Two years later the patient died from a recurrence of the femoral hernia, with strangulation. At the autopsy the circular scar of the anastomosis was scarcely visible, and the portion of gut beyond, which at the time of the operation was greatly atrophied, was found completely normal.

In another case, a coil of intestine in an umbilical hernia became gangrenous by twisting upon itself. A fecal fistula resulted. In this case, also, the opening gradually became too narrow for the passage of the intestinal contents. The twisted coil of intestine was freed from adhesions, the opening in the gut sutured, and the radical operation for umbilical hernia performed.

Of the three cases of fistula in femoral herniæ one died from perforation in the suture line, and the two others were permanently cured. The fistula in one of these was cut around, and the incision extended upward parallel with the epigastric artery, the gut liberated from the canal, 6 cm. resected, and united with the circular suture. Perfect healing without drainage. The other intestine was exposed by an incision parallel to Poupart's ligament, the herniated gut freed, and the opening diagonally united. Healing without drainage.

Two of the fistulæ operated upon were due to inguinal hernia. In one case an internal strangulation occurred from adhesion to a string of omentum three months after the herniotomy. This was relieved by laparotomy, but a fæcal fistula developed in the middle line. Three months later another laparotomy was done, the omentum again resected, 15 cm. of the adherent fistulous gut removed, and the patient completely cured by the circular suture and without drainage. The last of the seven cases was cured by the old method with the intestinal scissors of Dupuytren. The cases operated upon by the modern method of freeing the borders of the fistula and suturing the intestinal opening were healed completely in fourteen days. The author asserts that the most difficult case of fæcal fistula remaining after hernia can be cured by the direct suture or by resection of the intestine, while the simpler cases to which the old method is applicable can be cured much quicker and surer by the modern enterorrhaphy.

To sum up the mortality in the cases of intestinal suturing and resection, of ten operations for malignant tumor five died ; of eleven for tuberculosis, two died ; of four for invagination, one died ; and of seven for fæcal fistula, one died ; thirty-two operations with nine deaths. Of the three double resections for carcinoma with one recovery, a multiple resection for tuberculosis and an acute invagination with gangrene are excluded, twenty-seven cases remain, with five deaths.

During the first half of the period in which these operations were done, seven out of fourteen patients died ; but during the second half of the period, since 1888, as a result of riper experience, only

two out of eighteen perished. Czerny is confident that experience is the very important factor in intestinal surgery, and that a dextrous operator will make the same progress as did Spencer-Wells in the field of ovariectomy. He believes that it is possible by a carefully selected technique to reduce the mortality to 10 per cent.

The technique employed in these operations may be briefly spoken of. The larger part of these operations were performed in the general operating theatre of the clinic. The greatest attention was given to the diminishing of the danger of contact infection, to the disinfection of the field of operation, the hands, instruments, sponges and dressings. The operating room was cleansed with the carbolic spray before the operation. The spray was also generally employed during the operation, though not over the field of operation, but chiefly for the purpose of keeping the air damp. The patients were kept for at least two days on fluid diet, and then thorough evacuation of the bowels was effected, and, in stomach operations, the stomach was repeatedly washed out with boracic or salicylic solution. The emptying of the gut in case of stenosis is very difficult, and Czerny thinks that it is perhaps better, as König has advised, when circumstances do not permit giving a number of days to the use of mild procedures, to entirely withhold laxative measures, and then at the operation thoroughly empty the proximal part of the gut through the wound made for the resection.

The hands, suture materials and instruments were sterilized after the newest approved methods, and all of the aseptic precautions were carried out.

The warmed operating table of Julliard was employed for the long operations. The anæsthetic was preceded by a hypodermic injection of morphine, and begun with chloroform, which as soon as anæsthesia was established was followed by ether, which was continued throughout the operation. For clamping the stomach two steel rods, covered with rubber tubing, were employed. One is placed on either side of the stomach, and the two ends of the rods bound together with silk thread. For the intestine simply a loosely

fastened elastic ligature is used. The suturing was invariably done with silk.

The method employed in the circular resection consists in first applying the posterior serosa sutures, knots internally, and cutting the ends short, excepting the two end sutures, which are left long for the purpose of identification. Then the posterior mucosa sutures are applied and tied internally. The anterior mucosa sutures are next introduced, and tied externally. This is done by first introducing the middle suture, and then continuing outward, thus avoiding the unevennesses which are apt to occur in applying the sutures in the opposite direction. Finally, the outer serosa sutures are applied. In the above operation it was often the custom to add a third suture line, or attach the mesentery or omentum about the line of suture for the purpose of strengthening some weak place.

One to three sutures to the 1 cm. was the rule—the thinner the gut the closer together the sutures. In the serosa the running suture was often used instead of the interrupted. The latter are preferable in the mucosa, because they accomplish better hæmostasis. The running suture can be more quickly applied, and it is not so apt to cause necrosis; but it is not so sure as the other and tends to narrow the lumen of the gut. The abdominal wounds were closed by the old Simon or Spencer-Wells method—the double row of interrupted silk sutures.

The question of nourishing the patients after these operations is a difficult one. The authors hold that it is best to keep the patient for eight days on nutrient enemata. A teaspoonful of cold tea, a drop of cognac in ice-water, or rinsing out the mouth with lemon juice in water suffices to quench the thirst. In intestinal operations beef tea, meat jellies, cold milk, are allowed after the third day. In stomach operations fluids are allowed in the second week, and in the third week easily-digested foods. So is there a difference in different cases as to the bowel movements. Patients who have been operated upon for stenosis usually have a free movement on the first day after the operation. In other cases enemata have to be used, and the milder laxatives should not be employed too early.



The report of these operations is given by Czerny and Rindfleisch as an example of the value of the double-row intestinal suture, as being still preferable to the other methods of intestinal anastomosis.

JAMES P. WARESS.

### MORRIS ON INFECTIVE ECPHYADITIS.

At a meeting of the Surgical Section of the New York Academy of Medicine on April 10, 1893, Dr. Robert T. Morris presented the outlines of a forthcoming paper upon the subject of infectious ecphyaditis. He was not the first to suggest the use of the mononym ecphyas in place of appendix vermiformis cæci, but was in favor of adopting the word because the word appendix used synecdochically meant nothing in particular, and the word appendicitis was half Latin and half Greek in derivation. Ecphyaditis being wholly from the Greek would be satisfactory to the purists.

The author then described ecphyaditis as an infectious exudative inflammation, commonly terminating in connective tissue replacement of the mucosa and lymphatic tissue of the ecphyas.

Incidents in the history of the disease were typhlitis and perityphlitis from extension of infection along the lymph channels, and mesenteric thrombo-phlebitis from extension by way of the blood-vessels. Complications of the typhlitis and peri-typhlitis were local abscess and local peritonitis with their groups of later complications. Complications of mesenteric thrombo-phlebitis were abscess of the liver, portal embolism, pyle-phlebitis and general septic peritonitis. The latter group of accidents might happen in cases in which the ecphyas was not held in suspicion.

He believed that the commonest history of the disease was marked by the following stages: First, a brief period of catarrhal inflammation excited by foreign bodies or faecal concretions in the lumen of the ecphyas, or by exposure to cold, or by other diseases. The ecphyas being rudimentary in structure was functionally unable

to control its diseases, and the second stage was therefore quickly ushered in. The second stage was marked by a mixed infection with streptococci, staphylococci and bacilli, and all structures of the ecphyas were then invaded with serum, fibrin and leucocytes.

The third stage consisted in gradual breaking down of the adenoid tissue and mucosa and replacement of those structures by connective tissue. In the fourth or quiescent stage of the disease there was complete destruction of the mucosa and obliteration of the lumen of the ecphyas. The entire process might require months or years for its completion, and the author doubted if recovery occurred at any intermediate stage than of disappearance of the mucosa and adenoid tissue. The patient, however, might perhaps be unaware of the presence of the disease. Specimens from patients whose cases were of the simple type were presented in illustration of each stage of ecphyaditis except the first, the author not having been able as yet to catch a case in the catarrhal stage. The microscopic appearance of the exterior and interior of some of the specimens would not lead a casual observer to suspect their real condition, and in all probability many an infectious ecphyas has been replaced in the abdominal cavity because the surgeon who made an exploratory incision failed to find what he had expected to see. We can no more trust an ecphyas than we can an egg by external appearances.

While ecphyaditis may complete its course without giving rise to important symptoms, the author believes that there are usually mild attacks of colic caused by unrest of the muscular sheath of the tube, or slight septic symptoms from absorption of products of bacterial growth. When, however, the muscular sheath is excited to the point of violent spasm, the patient is in agony from the resulting colic, and he is in a position of acute danger because the muscular tube is at that moment trying to strangulate the mucous and adenoid tube. Relaxation of the constricting grip may often be obtained by hot fomentations and other sedatives, but it is not difficult to decide when to operate in infectious ecphyaditis, because on rational grounds we should operate when violent colic begins, or as soon thereafter as possible. Relap-

sing cases are of two principal sorts: Cases in which the muscular coat is excited at various times, and cases in which all structures of the ecphyas have disappeared, leaving an encapsulated pyogenic sac which fills in exacerbation and empties by absorption from time to time.

Before adhesions have formed the ecphyas can be removed through an opening in the abdominal wall, barely large enough to admit the surgeon's finger; we have only to find the longitudinal muscular ribbon of the colon or cæcum, and that will guide directly to the ecphyas. The specimen which the author presented as illustrating the second stage of infectious ecphyaditis showed such swelling from exudates, leucocytes and bacteria, that strangulation of the mucosa could apparently have occurred without the aid of a contracting muscular tube. Superficial necrosis of the mucosa was in progress, but the patient thought himself quite well at the time of the operation, which was performed to avoid the danger of a recurrence of former symptoms.

Microscopic sections and photo-micrographs were presented, showing the following features:

- (1) Normal structure of ecphyas.
- (2) Mucosa from mild case of infectious ecphyaditis, presenting small areas of necrosis, broken-down mucous follicles, breaking down adenoid tissue, bacteria and leucocytes; there was no epithelium remaining.
- (3) Round-cell infiltration of muscular coat of ecphyas.
- (4) Proliferating endarteritis from mesentery of ecphyas (probably not significant).
- (5) Longitudinal and transverse sections of a vein from mesentery of ecphyas, showing a thrombus, and illustrating the danger from thrombo-phbetitis and its complications in simple cases of ecphyaditis.

The author had not made cultures in search for specific bacteria, because the streptococci that were found were abundantly able to produce every feature of infectious ecphyaditis and its complications. He believed that early operations in these cases meant practically no

death rate and trifling abdominal scars, while late operations meant a pretty large death rate and disfiguring abdominal scars.

The present sentiment in favor of removing the inflamed ecphyas had been opposed by men who quoted the unnecessary ovarian surgery of the last decade, but the conditions were very different. An inflamed ovary is often useful and not often a menace to life, excepting when neomata are present. An inflamed ecphyas is at all times useless, and a direct menace to life.

L. S. PILCHER.

## INDEX OF SURGICAL PROGRESS.

### ABDOMEN.

**I. The Treatment of Obstruction of the Large Intestine by Temporary Typhlotomy.** By HARRISON CRIPPS, F. R. C. S. (London). The author remarks that unless the obstruction can be felt in the rectum, or some definite tumor be discovered in the abdomen, its exact site in the large gut cannot be determined. He advises in the first instance careful injections with the view of possibly washing away an obstructing plug. If these fail to give relief, abdominal section is the last resort, the author recommending that in the first instance the incision should be made in the left inguinal region, between the umbilicus and the anterior superior spine. He related to the Harveian Society of London two cases in detail, in which he had found, after making the abdominal incision on the left side, that the sigmoid and descending colon were empty and collapsed. In each of these cases he closed the wound and opened the abdominal cavity on the right side over the cæcum. The parietal peritonæum was carefully stitched to the portion of the bowel in such a way that only a circular portion of the cæcum, no bigger than a dime, was exposed; through this an opening was made which gave immediate relief to a large quantity of air and liquid feces. In both cases, after nine and thirteen days respectively, the stools appeared in the natural way, and in both the caecal fistula was subsequently closed. The author advocates temporary typhlotomy in all cases where the obstruction proves to be above the descending colon, and, moreover, advises that the opening in the cæcum in the first instance be quite small, so that it may be easily closed should the obstruction subsequently give way, and the stools pass through the normal channel.—London *Lancet*, June 28, 1892.

**II. Washing Out of the Stomach After Operation for Strangulated Hernia.** By HERBERT LUND, F. R. C. S. (Salford Royal Hospital). Three cases are related: (1) A man, aged twenty-two years, had a right inguinal hernia of two years' duration, which became strangulated. Bilious and faecal vomiting persisted for two days and the patient became very collapsed; herniotomy was then performed, the sac being removed and the pillars of the ring approximated with strong catgut. The stomach was then washed out freely with warm water until the returning water was perfectly clear. The temperature after the operation was  $100^{\circ}$ , falling in the next two days to  $98.2^{\circ}$ . There was no sickness or feeling of nausea after the operation, and the patient made an uninterrupted recovery. (2) A man, aged thirty-three years, had a left inguinal hernia for eight years, which became strangulated while lifting; vomiting continued during the ensuing twenty-four hours, when herniotomy was performed as in the preceding case. The stomach was then washed out, the first washing being almost entirely faecal matter, and continued until the returning liquid was quite clean. The temperature never went above normal, and there was neither sickness nor nausea after the operation. The patient made an uninterrupted recovery. (3) A man, aged forty-six years, had worn a truss for right femoral hernia for four years, but the protrusion frequently slipped down behind the pad of the instrument. On the present occasion it slipped down and became irreducible; vomiting set in and continued more or less for the next week, when it became very faecal. Herniotomy was performed as in the preceding cases, the stomach being washed out with nine parts of warm water. There was no vomiting or nausea, the temperature did not rise above  $99.2^{\circ}$ , and the patient made a good recovery.

The author's object in publishing these cases is to draw the attention of the profession to the good results obtained by the simple procedure of washing out the stomach freely after there had been faecal vomiting, by which means the prolonged vomiting and nausea, which is liable to follow herniotomy, is avoided. He remarks that

he has seen at least one case where he is confident washing out the stomach might have saved the patient. The absence of nausea after the author's cases is particularly noteworthy, as ether was the anæsthetic used.—London *Lancet*, February 4, 1893.

JAMES E. PILCHER (U. S. Army.)

## GENITO-URINARY ORGANS.

**I. Nephrorrhaphy for Movable Kidney.** By GEORGE M. EDEBOHLS, M.D. (New York). The author advocates fixation of the kidney by suture in all cases of movable kidney where patient's life is endangered by the persistence of the condition, or in which the sufferings are of such an aggravated character as to make life a burden. During the period between January 1, 1890, and March 10, 1893, the reporter has resorted to nephrorrhaphy for the relief of movable kidney in twenty-two instances, in one case both kidneys being sutured. In one case the peritonæum was accidentally opened and a rapidly fatal peritonitis followed, presumably from diphtheritic infection, the operator himself having been found to have been suffering from incipient diphtheria at the time of the operation. In all the other cases good recoveries were secured, and in none up to the time of the report had the kidney again become movable.

In the operation, the kidney having been well exposed and brought up into the incision, the capsule of the kidney is incised in the mesial line along the whole length of the convexity of the organ, and stripped back about a centimeter and a quarter to either side, so as to expose a raw surface two and a half centimeters broad and from ten to twelve centimeters long for union with the deep parts of the lumbar incision. The stripped back capsula propria is not cut away, but is simply doubled back like the lapel of a coat. The kidney is now attached to the deeper and firmer tissues of the abdominal walls, the muscles and aponeuroses, by five or six buried sutures of silkworm gut introduced deeply into the kidney tissue, care being taken not to draw the sutures too tightly, as they readily cut through the friable

kidney substance. A drain, composed of ten or twelve silkworm gut strands, is passed along the raw kidney surface and brought out at the angles of the skin wound. The skin and superficial fat are sutured by a separate suture of catgut. The dressings are changed on the eighth day, when the drain is removed. The patient is kept on the back for three weeks, and then allowed to sit up and go about as she pleases. No supporters of any kind are used after the operation. The author summarizes his observations and conclusions as follows:

Movable kidney is of much greater frequency in the human female than is generally supposed. Of a series of five hundred women examined by the author, ninety were found the possessors, among other things, of movable kidneys.

The affection *appears* to be comparatively rare among men.

In the overwhelming majority of cases the right kidney alone is movable.

Not every movable kidney produces symptoms.

The symptoms of movable kidney frequently both coexist with and simulate those of various diseases of the female sexual organs. The discriminating diagnosis may offer difficulties.

Atrophy or absorption of the peri-renal fat is the chief ætiological factor in the production of movable kidney. Other causes assigned by various authors are: Tight lacing, laxity of abdominal walls, congenital predisposition, and severe straining.

A distinction should be maintained between movable and floating kidney.

A movable kidney is one movable within a pouch or hollow formed within its own fatty capsule. A floating kidney has normal relations with that portion of its fatty capsule which it carries with it in its excursions, and is supplied with a mesonephron, the length of which determines the degree of mobility. This paper deals only with the movable kidney.

The symptoms are likely to be more distressing in the earlier than in the final stages of movable kidney.

The most characteristic combination of symptoms of uncompli-



cated movable kidney is the following: Digestive disturbances, chronic in character; epigastric pain, usually located somewhat to the left of the median line; general nervousness; cardiac palpitation; inability to feel comfortable, or to sleep, when lying on the left side.

The other symptoms associated with movable kidney occur less frequently and are of secondary significance.

The symptoms of movable kidney are accentuated during menstruation and the early months of pregnancy. They disappear during the latter half of pregnancy and during the existence of large intra-abdominal growths.

The symptoms of movable kidney are due to pressure and traction upon, stretching, and irritation of various parts of the solar plexus of the sympathetic and of its branches. The theory of obliteration of the lumen of the duodenum, by pressure or traction, is insufficient to account for the symptoms.

A movable kidney is the easiest of all intra-abdominal conditions to diagnose. The diagnosis is made by palpation of the displaced organs.

A kidney once movable never again becomes firmly fastened in normal position except by operative interference.

The symptoms due to movable kidney may be ameliorated by the dorsal decubitus, the Weir Mitchell treatment, massage, electricity, and abdominal supporters. All these measures are, however, in the large majority of cases disappointing, and the benefit obtained, if any, is likely to prove only transient.

Nephrectomy, or extirpation of the movable kidney, is too radical and dangerous a resource as compared with nephrorrhaphy.

Nephrorrhaphy *properly* performed upon properly selected cases can, as demonstrated by histories, be depended upon to afford relief, with a good prospect of the permanency of the latter.—*Amer. Jour. Med. Sci.*, April, 1893.

**II. Nephrectomy, Lumbar and Abdominal.** By A. G. HUME, M.D. (Newcastle-on-Tyne). The author relates two cases, one of each variety: (1) A man, aged forty-three, had for three years suffered from pain in the back, with frequent exacerbations, often very severe. The urine has presented a milky deposit, gradually increasing in amount. Had been operated upon for stone in childhood. The abdomen presented a firm, rounded tumor about the size of a cocoanut, which could be felt projecting under the ribs on the left side, its margin well-defined above, but disappearing under the ribs above; it was dull on percussion, the dulness extending laterally and posteriorly as high as the angle of the scapula; the mass was fixed, or moved only very slightly during forced respiration, and was tender on firm pressure. The urine contained a large amount of pus, and the patient, in spite of rest and treatment, continued to lose weight at the rate of two or three pounds a week. After demonstrating the presence of pus in the kidney by the hypodermic needle, the kidney was opened by the *lumbar incision*; pus was evacuated largely, and the finger in the incision found calculi and calculous matter in different cavities. It was then determined to remove the kidney, and the first incision was extended toward the linea semilunaris and for a couple of inches downward along the outer border of the rectus. The tumor was gradually separated with the finger from the thickened and adherent peritonæum and, as the separation went on, it had to be forcibly dragged down from under the cover of the ribs; the thickened pedicle, containing artery and vein, was transfixed and tied, the dilated ureter being secured into the wound. An accidental opening into the peritoneal cavity was closed by puckering the edges together and ligating. The wound was closed with a drainage tube above and below. The patient rallied well and made a good recovery. (2) A man, aged forty-one years, had been losing weight for a year, and for nine months had felt pain in left side, where a hard nodular tumor about the size of a fetal head, could be felt, with an irregular outline, well defined below and passing under the ribs above. There had been no hæmaturia, and the urine was

practically normal. Through an incision six inches long from the margin of the ribs in the linea semilunaris, the tumor was found to be in the left kidney. A lumbar incision was then made from the middle of the first cut, dividing all the structures forming the abdominal wall, including the peritonæum. The intestines were pushed toward the right and protected with sponges. The peritonæum covering the kidney was then separated until the whole growth was exposed. The separation was first carried out anteriorly to nearly the position of the pedicle; then the lower end being detached the tumor could be lifted out of its bed and drawn down: the freeing of the upper part was facilitated by a broad retractor passed under and raising the ribs. The vessels forming the pedicle were in part directly ligatured, in part clamped and afterward tied. The cavity was packed with iodoform gauze, the ends of the strips being brought out through an opening made specially for drainage in the most dependent part of the loin; thirty-six hours later the gauze was removed and a drainage tube introduced. Except for a slight sup-puration at the lower part of the wound, the patient made an uninterrupted recovery in one month. The growth proved to be a large round-celled sarcoma, growing from the upper part of the concave border, so that the unaltered kidney was expanded over the posterior aspect of the tumor.—London *Lancet*, January 28, 1893.

JAMES E. PILCHER (U. S. Army.)

## BONES, JOINTS, ORTHOPÆDIC.

**II. Thirty Cases of Excision of the Knee-joint.** By A. G. MILLER, F.R.C.S. Edin., (Edinburgh). The author gives an analysis of his cases as follows :

Case.	Age.	Leg.	Disease.	Result.
1	23	Right.	Synovial tubercle; sinuses; septic.	Fairly good; no pain; walks with two sticks.
2	25	"	Rheumatic synovitis followed by bone tubercle.	Very good.
3	26	"	Advanced synovial tubercle.	Very good.
4	17	"	Advanced bone and synovial tubercle.	Very good.
5	18	"	Extensive tuberculous disease.	Amputation 6 weeks later for return of tubercle in cellular tissue.
6	18	"	Synovial tubercle.	Good.
7	23	"	Synovial tubercle.	Very good.
8	13	"	Synovial tubercle.	Very good.
9	20	Right.	Extensive tuberculous disease.	Amputation 5 weeks later for return of tubercle in bone and cellular tissue.
10	30	"	Synovial tubercle.	Very good.
11	22	Left.	Synovial tubercle.	Limb too movable.
		"	Synovial tubercle (second operation).	Very good.
12	42	Right.	Extensive tuberculous disease of rheumatic origin.	Fair. Died of phthisis 4 years later.
13	11	"	Synovial tubercle.	Good.
14	12	"	Synovial tubercle.	Very good.
15	7	Left.	Synovial tubercle. Eriasion performed.	Very good.
16	30	Right.	Synovial tubercle.	Very good.
17	19	"	Extensive tuberculous disease.	Amputation 3½ months later for return in bone and cellular tissue.
18	19	Left.	Anchylosis after partial dislocation; tubercle in tibia.	Very good.
19	12	"	Extensive tuberculous disease.	Amputation 2 years later for return in bone and cellular tissue.
20	57	"	Syphilitic ostitis.	Very good.
21	21	"	Anchylosis after healing of long-standing tuberculous disease.	Very good; slight motion.
22	22	Right.	Anchylosis after operation for genu-valgum; tubercle discovered at operation.	Fairly good.
23	30	"	Bone tubercle secondary to rheumatism.	Very good.
24	16	"	Synovial and bone tubercle.	Very good.
25	43	"	Tubercle, extensive and acute, after rheumatoid arthritis.	Died 4 days later from fatty heart and persistent chloroform sickness.
26	15	Left.	Synovial tubercle.	Very good.
27	10	"	Synovial and bone tubercle.	Return of tubercle in femur along line of knee; ultimate result good.
28	37	"	Extensive tuberculous disease.	Discharged with sinus 3 months later; amputation advised.
29	8	"	Synovial tubercle.	Very good.
30	5	"	Synovial and bone tubercle.	Very good.

The author aims in his operations to remove the anterior (and principal) portion of the diseased synovial membrane by reflecting the skin off it and dissecting it out as if it were a tumor—"and a tuberculous tumor it certainly is." The longest part of the operation consists in scraping away the remaining synovial membrane before cutting the fibrous structures which they cover. He always removes slices of bone from the femur and tibia, because he has frequently found unsuspected tuberculous foci after opening up the cancellous texture of the epiphyses. A less important, and mainly æsthetic part of his procedure, is the removal of a portion of skin from the anterior flap so as to do away with the redundancy of skin, otherwise so perceptible.

The author remarks in conclusion, that it is not his usual practice to excise strumous knees; he successfully treats them by rest, counter-irritation and immobilization.—London *Lancet*, February 4, 1893.

JAMES E. PILCHER (U. S. Army.)

## HEAD AND NECK.

**I. Affections of the Supra-Clavicular Glands in Cancers of the Abdomen.**—By Dr. E. TROISIER (Paris). The author resumes a study of the affections of supra-clavicular glands which may appear in the course of a cancerous affection of the abdomen, by reciting additional cases, with comments, and presents a resumé of his conclusions as follows:

Disease of the supra-clavicular glands does not necessarily depend on an intra-thoracic cancer. It appears frequently in the course of an intra-abdominal cancerous affection. It manifests itself most often at an advanced period of the disease; sometimes, however, it appears early, even eighteen months or two years before death.

At the beginning it has to be sought for to be found; it lies behind the clavicle. Later it forms a more or less voluminous tumor, which projects into the supra-clavicular fossa. It may remain stationary, or continue to increase. It is formed by one or several glands,

hard, nodulated, usually movable, in some cases fixed to the subjacent parts, not adherent to the skin.

It is situated nearly always on the left ; sometimes it is bilateral. It is associated quite often with axillary and inguinal glandular affections, and even with affections of the epitrochlear gland. It may precede or follow the other external glandular affections. The carotid glands may become involved after the supra-clavicular glands.

The predilection of the affection for the glands of the left side is explained by the anatomical relations, which exist between the supra-clavicular glands and the termination of the thoracic duct. Sometimes this duct has itself undergone cancerous degeneration. When it is not altered it is probable that it serves for the transportation of the cancerous elements which, derived from the abdominal neoplasm, follow this path as far as to the supra-clavicular glands, where they become engrafted. A chain of cancerous glands often connect the cervical affection with the primary lesion.

Affections of the supra-clavicular glands are of clinical importance, and should be sought for as systematically, in affections of the abdomen, as are axillary glandular affections in tumors of the breast. —*Arch. General. de Méd.*, April, 1893.

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